

MINERALOGICAL ABSTRACTS

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Notices of Books.

NIGGLI (Paul). *Lehrbuch der Mineralogie. II: Spezielle Mineralogie*, unter besonderer Mithilfe von L. WEBER. 2nd edition, Berlin (Borntraeger), 1926, xvi + 697 pp., 330 figs. Price 30 Mk. (bound 33 Mk.).

The first volume of this second edition appeared in 1924 [Abstr., vol. 2, p. 365]. The present volume treats of descriptive mineralogy. On pp. 6-34 is given a more or less orthodox chemical classification of minerals, in which there are some useful ideas. But on p. 35 this is all abandoned and minerals are classified on a crystallographic basis. The arrangement of minerals by crystal-systems has become familiar through the several editions of H. Rosenbusch's 'Microscopical Physiography', and this has its advantages in connexion with the optical determination of rock-forming minerals. We are now taken a step farther, but the arrangement is not according to crystal-systems or crystal-classes, nor is it based on symmetry or on internal crystal-structure. The standpoint is that of 'comparative external morphology' based on a modification of the arbitrary grouping of crystals devised by E. S. Fedorov, but with special importance attached to the development of zones and combinations of crystal-forms. We are presented with five main groups of minerals: *A*, crystals of cubic or hypo-cubic type; *B*, crystals of tetragonal or hypo-tetragonal type; *C*, crystals of hexagonal or hypo-hexagonal type; *D*, crystals of more or less pronounced lower symmetry; *E*, colloidal-amorphous substances. *A* is subdivided into: 1, hexahedral type; 2, octahedral type; and 3, rhombic-dodecahedral type, with a tetrahedral sub-type in no. 3. Under *A*1 are included halite group, galena group, argentite group, pyrite group, periclase group [all good cubic minerals, but then we pass on to] tenorite, cryolite, perovskite, bournonite, calcite group, red-silver group, chabazite group, anhydrite [here are interlarded general remarks on the hexahedral type], bornite, pentlandite, arsenic group, [and finally the typically cubic] fluorite. A stranger assortment of minerals could scarcely have been picked out of a hat! The suggestion

that they have any real relationships, even crystallographic, cannot be taken seriously. In turning over the pages of the book one is rather reminded of an eighteenth-century treatise, where the strange conjunctions are often rather amusing. In the description of individual minerals the author also breaks away from established usage, and there is much that is open to criticism. Numerical data for various physical constants are tabulated in some detail, but it is not always clear what units are employed and, in the absence of references to original sources, these cannot be checked. Localities of minerals are but briefly mentioned, and then only in connexion with copied figures or data; and the statement of them is inadequate and often misleading. For example, 'Jefferson Cty.' with the figure of a calcite crystal—there is a Jefferson County in each of 23 of the States of U.S.A. and more than one Jefferson City. The streak of originality that runs through the whole volume persists even in the much too short list of errata on the last page. There new (and incorrect) spellings are devised for the mineral names trechmannite and voelckerite, although these appear quite correctly in the text.

L. J. S.

FRIEDEL (Georges). *Leçons de cristallographie professées à la Faculté des Sciences de Strasbourg*. Paris (Berger-Levrault), 1926, xix + 602 pp., 578 figs. Price 60 frs. (bound 75 frs.).

This book does not profess to be a complete treatise on crystallography, but rather it aims at being educational, and the student is encouraged to be original and critical. Some special points on which the author has published papers are dealt with in more detail. Structural types of matter are distinguished as (1) amorphous, (2) nematic, (3) smectic (these two being grouped as mesomorphous), and (4) crystalline. The last is characterized by possessing discontinuous vectorial properties in a sheaf of planes that obey the law of Haüy. Five kinds of discontinuous vectorial properties are recognized: (a) rate of growth, (b) diffraction of X-rays, (c) cohesion (cleavage), (d) twinning, and (e) gliding; and it is these that are dealt with in the present volume. A second volume dealing with continuous properties (including optical) and with mesomorphous types is promised. The first section, on geometrical crystallography, deals with symmetry and the 32 types of symmetry; the choice of the primitive form as deduced from the reticular density in different planes; and a detailed account of the 230 space-groups, using the notation of Schoenflies. Other matters discussed are the regular intergrowth of crystals of different substances, isomorphism, and polymorphism. In the

volume we find no mention of the same author's '*Leçons de cristallographie*' published in 1911 [*Min. Mag.*, vol. 16, p. 163], which was based on his lectures at Saint-Etienne, although several of the chapter headings, some of the text, and many of the figures are the same as in the earlier volume. The figures have, however, been redrawn, but several of them are still faulty. The book is printed on thin paper with a large page and is not easy to handle. There is no index. L. J. S.

GROTH (P.). *Entwicklungsgeschichte der mineralogischen Wissenschaften*. Berlin (Julius Springer), 1926, v + 262 pp., 5 figs. Price 18 Mk. (bound 19.50 Mk.).

This essay on the historical development of the mineralogical sciences is especially interesting in being from Professor Groth, who has been a leader in these subjects for half a century and is now aged 83. It is divided into two sections—'*Krystallkunde*' (pp. 3–143) and '*Mineralkunde*' (pp. 147–237)—and the period covered is up to the end of the nineteenth century; that is, previous to the recent developments in crystallography due to X-ray methods. Besides chapters on geometrical crystallography, there are others on physical and chemical crystallography and on the recognition of the connexion between the form of crystals and their optical properties. The mineral section contains chapters on the crystallography of minerals and the optical determination of rock-forming minerals, the paragenesis of minerals, and on the chemistry of minerals, including the study of their alteration and artificial reproduction. Mention is made of the more important works on topographical mineralogy and a short account is given of the better-known mineral collections in various countries. In an appendix are given 37 biographical notices of the more prominent past workers mentioned in the text. There is a short subject-index and also one of authors. The latter is very incomplete, many more names being mentioned in the text than appear in the index. L. J. S.

TERTSCH (H.). *Trachten der Kristalle*. Forschungen zur Kristallkunde, herausgegeben von Arrien Johnsen, Heft 1. Berlin (Borntraeger), 1926, viii + 222 pp., 58 figs. Price 15 Mk.

This is the first number of a series of monographs each of which is to deal with some special branch of crystallography. About six such numbers will form a volume. Similar series of monographs treating of rocks and ore-deposits are promised. The present monograph is an exhaustive study of the habit of crystals, a subject on which the author, an extra Professor of Mineralogy in the University of Vienna, has

written original papers [Abstr., vol. 2, p. 325]. The best-known example of wide variations in crystal habit shown by a single mineral is that of calcite; classical examples are the crystallization of sodium chloride as octahedra from a solution containing urea (Romé de l'Isle, 1783) and of alum as cubes when ammonia is present in the mother-liquid (N. Leblanc, 1802). The reason for these differences in habit has long been a problem, but until now has not been seriously studied. F. Peudant published in 1818 '*Recherches sur les causes qui déterminent les variations des formes cristallines d'une même substance minérale*'; but it was F. Becke in 1903 who first made systematic measurements of the central distance ('ZD') of the crystal-faces. The influence of concentration of solution, temperature, pressure, position, other substances present in the solution, &c., is each discussed in detail. The subject is of course closely connected with that of the growth of crystals, which is also considered. Distortion and irregularities of growth and the habit of twinned crystals are dealt with. A bibliography of 181 titles is appended and there is an index. The value and interest of the book would have been enhanced by a more liberal supply of illustrations.

L. J. S.

MARK (Hermann). *Die Verwendung der Röntgenstrahlen in Chemie und Technik*. Handbuch der angewandten physikalischen Chemie, Band 14. Leipzig (J. A. Barth), 1926, xvi+528 pp., 1 pl., 328 text-figs. Price 48 Mk. (bound 50 Mk.).

Many books have now been published concerning the application of X-rays to the study of crystals. Most of these have given either a general survey of the whole or a detailed specialized account of some particular branch. It has been the aim of the author to produce a more comprehensive book, containing in one volume all that is essential for a scientific worker who wishes to apply the methods of X-ray crystal analysis to his own problems. It appears rather an open question whether the highly specialized technique of the X-ray and high-vacuum worker can be taught directly from a text-book without actual experience in the laboratory. Dr. Mark has, however, provided a book which goes a long way in attempting to do this. The book is well arranged. The first part is concerned with the general electrical theory of high-tension apparatus. Vacuum apparatus is then discussed, and a very useful table comparing the different types of pumps is given on p. 74. In the pages dealing with X-ray tubes much space is devoted to the Hadding tube. Chapters then follow on the theory of the scattering, absorption, and polarization of X-rays. The apparatus suitable for crystal investigations by means of X-rays and for

X-ray investigations by means of crystals are described. An interesting chapter for the chemist should be that on the applications of these methods to chemical analysis: it was this application which led to the discovery of hafnium. The chapters on crystallography are very interesting. The author introduces at the start the ideas of reflection, rotation, and rotatory reflection, and proceeds to discuss the 32 crystal-classes. A table is given which brings together various details of these classes and some of the different notations used in describing them. It is restricted, however, to alternatives of German origin. Further symmetry conceptions are now introduced and the 230 space-groups discussed. It is then shown that all these structures are based on 14 fundamental space-lattices, which interpenetrate in various ways. This departure from the historical development of the subject is, perhaps, very good, since it emphasizes the idea of regarding a complicated structure as being formed from interpenetrating simpler structures. An extremely useful summary is given of the relationships between the various types of indices for trigonal and hexagonal crystals. The next chapter gives some account of the elements of the wave theory of physical optics. Experimental crystal analysis is then dealt with, and the advantages of the rotating crystal method for the determination of the unit-cell are brought forward. The methods of elucidating Debye-Scherrer diagrams and Laue photographs are fully dealt with. A very elegant table of abnormal spacings characteristic of the 230 space-groups is given. As an appendix are printed further space-group tables giving details of symmetry, the co-ordinates of equivalent points, &c. The last chapter concerns again various applications of these methods to problems somewhat removed from ordinary crystal analysis—to the question of crystallites and the size of particles, and to the extensions to the ordinary space-group theory at present being carried out by Weissenberg. G. GREENWOOD.

LAUE (M. von) & MISES (R. von). *Stereoskopbilder von Kristallgittern. I.*
—*Stereoscopic drawings of crystal structures. I.* Berlin (J. Springer),
1926, 43 pp., 24 pls., 3 text-figs. Price 15 Mk.

The volume consists of twenty-four plates for stereoscopic use and a descriptive booklet fitted together in a neat case. The descriptive text is in both German and English. The great difference between these stereoscopic pictures and any previously published is that these are not made by the usual method of photographing actual models made of wires and wooden spheres, but by photographing geometrical drawings. These geometrical drawings are made by a method based on that of H. Pollaczek.

The advantage of this is that it is possible to draw in the lattice picture just whichever lines the authors desire, so as to illustrate any particular vectorial derivation of the lattice. The space-lattices are all described vectorially, and even if this mode of description is rather difficult for the beginner, it is especially suited for giving a concise account of the lattices and their relationships. This volume is the first of a series, and the plates show the fourteen Bravais lattices and ten of the simpler well-known crystal-structures, such as rock-salt, diamond, and fluorspar. Many new and up-to-date numerical data concerning lattice dimensions of the structures depicted are given in tabular form in the text. The drawing and the printing of the stereoscopic plates have been well carried out.

G. GREENWOOD.

PIRSSON (Louis V.). *Rocks and rock minerals. A manual of the elements of petrology without the use of the microscope.* Second edition, revised by Adolph KNOPF. New York (John Wiley & Sons), London (Chapman & Hall), 1926, vii+426 pp., 36 pls., 74 text-figs. Price 17s. 6d.

A concise account of the first edition of this useful book was given in vol. 15 of the *Mineralogical Magazine* (1908, p. 187). The second edition is very largely a reprint of the first in better type and on better paper. The changes made are very few. The term 'dolerite' as a field name is now held to comprise 'those varieties of diorite and gabbro that, on account of increasing fineness of grain, cannot safely be determined or distinguished from the coarse-grained basalts'. This replaces the earlier definition suggested by Chamberlain and Salisbury. The term 'dense' applied to the second division of igneous rocks in the classification based on texture is dropped in favour of 'aphanitic'. The tabular classification is altered to include granodiorite, quartz-monzonite, monzonite, quartz-diorite, and corresponding 'porphyries'. As the additional names are not explained it may be doubted whether their inclusion makes for greater clearness for the special types of geologists for whom this book is intended. The subdivision of 'felsite porphyries' according to their phenocrysts is introduced into the tabular scheme. Diorite is brought over into the division of felspathic grained rocks instead of being left with gabbro in the ferromagnesian division. Anorthosite, although light coloured and felspathic, is described under gabbros in accordance with modern usage. In the classification of sedimentary rocks the division of 'surface accumulations', including laterite, is omitted in favour of 'ice-laid deposits'. The name 'argillite', previously used as synonymous

with slate, is dropped. There is a slight modification in the definition of gneiss.

W. C. S.

TYRRELL (G. W.). *The principles of petrology. An introduction to the science of rocks.* London (Methuen & Co.), 1926, xii + 349 pp., 78 figs. Price 10s.

This book is intended for the use of students, advanced students, and post-graduate researchers, and workers in other branches of science who may wish for a résumé of the present state of the science of petrology. All three classes of readers will find much helpful material. The subject is treated exhaustively but briefly. Igneous, Secondary, and Metamorphic Rocks are dealt with in three separate parts. Under Igneous Rocks are chapters on Forms and Structures, Composition of Magmas, Formation (including crystallization of binary and ternary systems, the reaction-relation, &c.), Textures and Micro-structures, Classification with brief descriptions of the more important rocks, Distribution, and Origin. In the tabular classification of igneous rocks five main divisions are based on the relations between quartz, feldspars, and feldspathoids, with a sixth division for rocks consisting almost wholly of ferromagnesian minerals. Plutonic rocks are again divided into felsic, mafelsic, and mafic types. The author is careful to point out that the volcanic rocks may not be equivalent to the plutonic rocks in the same division in this classification. This is important, and, if it were more often remembered, one of the main defects of such tabular classifications would be removed. Such a defect is well illustrated by the author's distinction between andesite and basalt. In his 'andesite' more than $5/8$ ths of the rock consists of 'felsic' minerals; it is dofelsic. Basalt, on the other hand, is mafelsic; less than $5/8$ ths consists of felsic minerals. Either rock may have a considerable range of plagioclase. This distinction is almost equivalent to that adopted by H. S. Washington. Under distribution the author offers some remarks on diagrammatic representation of igneous rock series and suggests the use of the terms kindreds, tribes, and clans to imply different degrees of closeness of consanguinity. Brief notices of practically all recent ideas on petrology have been included in this part of the work, and although the result is somewhat confusing it is perhaps the best that can be done in the present state of the science.

The Secondary Rocks are classified as Residual Deposits, Sedimentary Deposits, Chemical Deposits (including concretions, colloids, siliceous deposits, &c.), and Organic Deposits (including nearly all limestones, phosphatic and siliceous deposits of organic origin, and carbonaceous

deposits). It forms an excellent short text-book on the secondary rocks. The chapters on the Metamorphic Rocks are equally good, and a classification, based on some tentative suggestions made by A. Holmes, is given in tabular form. Various chapters deal with metamorphic minerals and the products of different kinds of metamorphism. These are taken in the order, cataclastic, thermal, dynamothermal, plutonic, ending appropriately with metasomatism and additive processes of metamorphism which, in the opinion of Sederholm and others, culminate in the production of new bodies of magma capable of producing again igneous rocks. W. C. S.

[ZAVARITZKY (A. N.)] Заварицкий (А. Н.). Физико-химические основы петрографии изверженных пород. [*Physico-chemical principles of the petrography of igneous rocks.*] Ленинград (Научно-Химико-Техническое Издательство) [Leningrad (Sci.-Chem.-Techn. Publications)], 1926, 233 pp., 94 figs. Price 4 rubl.

This is a good text-book for students in universities and technical high-schools. In scope it is somewhat intermediate between the purely theoretical work of H. E. Boeke and W. Eitel, 'Grundlagen der physikalisch-chemischen Petrographie' (1923) and that of O. H. Erdmannsdörffer, 'Grundlagen der Petrographie' (1924). Methods for the representation of the chemical composition of rocks are dealt with in some detail (pp. 31-66). Fig. 94 gives a genealogical tree of igneous rocks based on N. L. Bowen's hypothesis of a basaltic parent magma.

P. N. C.

Du TOIT (Alex. L.). *The geology of South Africa*. Edinburgh & London (Oliver & Boyd), 1926, xi + 463 pp., 1 geol. map, 39 pls., 63 text-figs. Price 28s.

This well-printed and well-illustrated volume gives an excellent and up-to-date account of the various geological formations of South Africa, including, beyond the Union, also Portuguese East Africa, Southern Rhodesia, and South-West Africa. There are several chapters of special interest to mineralogists. One deals with the Witwatersrand System of pre-Cambrian age and famous for the rich gold-bearing conglomerates or 'bankets'. Another with the Bushveld igneous complex of pre-Devonian age forming an enormous basin or 'lopolith' in which rich deposits of platinum have recently been discovered. Correlated with this are the remarkable 'Great Dyke' of Southern Rhodesia, the Vredefort dome, and perhaps also the Otavi granite with the rich Tsumeb ores in South-West Africa. Of late Cretaceous age are the numerous pipes and

fissures of kimberlite, alnöite, or merely shattered rocks, which are scattered over a wide area and only relatively few of which contain diamond. Information relative to useful minerals is collected together in a concise and useful chapter on economic geology, and there is also a brief chapter on soils. The coloured geological map (scale 1 : 5,000,000) is very clearly printed, and the plates give excellent views of geological scenery and some micro-sections of rocks. An appendix tabulates 38 chemical analyses of igneous rocks. Useful references to the original literature are quoted throughout the book and there is a good index.

L. J. S.

FIELD (Richard M.). *Geology manual. An instruction and laboratory manual for beginners.* Princeton (University Press) [& London (Humphrey Milford, Oxford University Press)], 1926, 132 pp., 17 pls. [numbered as pages]. [Price 18s.]

The 'first edition' of this well-printed book was issued in mimeograph form to the students taking the introductory course in geology at Princeton University, New Jersey. It might very well have stayed in that form, for as a book it is scarcely likely to be used outside the author's own classes. Several unnumbered pages are 'laboratory blanks' which are intended to be torn out and given up as exercises. The short portion dealing with minerals and rocks is very sketchy and contains many errors. Exercises in map reading occupy a large part of the volume. On p. 1 we read, 'Unfortunately minerals, like human beings, rarely attain perfection'—and the same may be said of books.

L. J. S.

Bibliographies.

SPENCER (L. J.), with preface by BRÖGGER (W. C.). *Données numériques de cristallographie et de minéralogie.* Paris, 1926 extrait du vol. 5 (for 1917-22), Tables annuelles de constantes et données numériques, x pp. + pp. 1285-1403. Price 50 frs. (bound 70 frs.).

A tabulation of numerical data relating to crystals and minerals published during the years 1917-22. In addition to the headings of previous issues [Abstr., vol. 2, p. 97], there is now a separate section for data of crystal-structures as determined by X-ray methods. Detailed references are given to the original literature. The introductory pages are unfortunately marred by many misprints, but proofs of the tables themselves were carefully corrected.

L. J. S.

Repertorium zum Neuen Jahrbuch für Mineralogie, Geologie und Paläontologie für die Jahrgänge 1910–1924, das Centralblatt für Mineralogie, Geologie und Paläontologie Jahrgänge 1910–1924 und die Beilage-Bände XXIX–L. Stuttgart (E. Schweizerbart), 1926, Band I, Personen-Verzeichnis, 444 pp.; 1926–27, Band II, Sach- und Orts-Verzeichniss, 867 pp.

In the author-catalogue the titles are quoted in the original languages when these are generally intelligible, but in other cases (Russian, Czech, Hungarian, &c.) German translations are given. As an appendix to the author-catalogue 'Personalia' and 'Miscellanea' from the Centralblatt are arranged under years, which makes search more difficult. The alphabetical index of subjects and localities is very detailed, but there is no key to the groupings, especially for localities. For example, there are separate entries for 'Amerika', 'Nordamerika', 'Canada', 'Kanada', 'Britisch-Columbia', 'Britisch-Columbien', 'Columbia, Britisch-', 'Ontaria' [*sic*], and 'Sudbury'. The two volumes supply a useful guide to the original literature for the fifteen years 1910–24, but they are not free from misprints.

L. J. S.

WEST (Clarence J.) & BEROLZHEIMER (D. D.). *Bibliography of bibliographies on chemistry and chemical technology, 1900–1924.* Bull. National Research Council, Washington, D.C., 1925, vol. 9, no. 50, 308 pp. Price \$2.50.

This is a companion volume to that relating to geology [Abstr., vol. 2, p. 479]. The bulk (pp. 19–303) is occupied by a bibliography of special subjects, arranged alphabetically under a large number of subject headings, e. g. abrasives, diamond, mineral paints, mineralogy, monazite, &c., as well as chemical elements, compounds, &c. There are also shorter lists of general bibliographies, abstract journals and year-books, general indexes to serials, and personal bibliographies.

L. J. S.

Geological literature added to the Geological Society's Library during the year ended December 31st, 1923. [No. 26.] London (Geol. Soc.), 1924, iii + 181 pp. Price 5s.

— year . . . 1924. [No. 27.] London, 1925, iii + 132 pp. Price 5s.

— year . . . 1925. [No. 28.] London, 1926, iii + 220 pp. Price 10s.

No. 28 (for 1925) of this series reverts to the plan of appending a subject-index (pp. 165–220) to the catalogue of titles arranged under authors. A subject-index for the five years 1920–24 is in preparation. [Abstr., vol. 2, p. 99.]

L. J. S.

DANYSZ-FLESZAROWA (Mme R.). *Bibliografja geologiczna Polski*.—*Bibliographie géologique de Pologne*. (Service Géol. Pologne.) No. 3 for 1924, 11 pp.

This gives a list of 145 titles, arranged under authors, of papers on the geology and mineralogy of Poland published in 1924. A short supplement to the 1923 list is added. [Abstr., vol. 2, p. 482.]

L. J. S.

Bibliographia geologica hungarica annorum 1916-1924. Földtani Köz-
löny, Budapest, 1925, vol. 54 (for 1924), pp. 227-256.

An alphabetical list of authors with the titles of papers on geology, including mineralogy, &c.

L. J. S.

STRATIMIROVIĆ (Vera).—Стратимировић (Вера). Геолошка библиографија
Балканског Полуострва. 1919.-1925.—*Bibliographie géologique de
la Péninsule Balkanique*. 1919.-1925. Геол. Анал. Балк. Полу.
(Ann. Géol. Pénins. Balkan.), Beograd, 1926, vol. 8, pp. 171-219.

An alphabetical list of authors with titles of papers arranged under each of these years. [Cf. Abstr., vol. 2, p. 100.]

L. J. S.

SPARN (Enrique). *Bibliografía de la geología, mineralogía y paleontología
de la Republica Argentina hasta el año 1899*. Acad. Nac. Ciencias,
Córdoba, 1921, Misc. no. 3, 93 pp.

— [Ditto] *años 1900-1914*. Ibid., 1920, Misc. no. 2, 58 pp.

— [Ditto] *Fascículo III: años 1915-1921. Con dos suplementos para
los años hasta 1914*. Ibid., 1922, Misc. no. 5, 50 + vii + xviii pp.

— [Ditto] *Fascículo IV: años 1922-1924. Con un suplemento para
los años 1915-1921*. Ibid., 1925, Misc. no. 11, 37 + viii pp.

These are alphabetical lists of authors with titles of papers. Brief subject and locality indexes are appended. For the period to 1899 the number of titles is 995, and for the years 1900-24 it is 1491.

L. J. S.

HENTSCHEL (Hans). *Mineralogie*. Jahresberichte des Literarischen
Zentralblattes, Erster Jahrgang (1924), Band 21 (Geologie, Mineralo-
gie), Leipzig, 1925, pp. 79-99.

This gives a series of brief abstracts of a selected number of books and papers published in 1924, and arranged under the headings: General, Crystallography and crystal-structure, Mineral physics, Chemical and

chemico-physical mineralogy, Petrography, Mineral deposits and individual minerals. An index of authors is appended. L. J. S.

KÖHLER (A.). *Verzeichnis der Arbeiten F. Becke's nach Jahren geordnet.*

Tschermaks Min. Petr. Mitt., 1925, vol. 38, pp. vii-xix.

A list of 256 titles of papers, &c., by F. Becke published during the years 1877 to 1924. This 38th volume of 'Tschermak's Mitteilungen', containing 35 papers (623 pp.) by many authors and a portrait of Professor Becke, is dedicated as the 'Festband Friedrich Becke' on the occasion of his seventieth birthday on December 31, 1925. L. J. S.

New Minerals.¹

SPENCER (L. J.). *Lead hydrogen arsenate as a mineral.* Nature, London, 1926, vol. 118, pp. 411-412.

A preliminary notice of the new mineral schultenite, orthorhombic PbHAsO_4 , from Tsumeb, South-West Africa. [See Min. Mag., vol. 21, p. 149.] L. J. S.

SCHOEP (Alfred). *Over ianthiniet, een nieuw uranium mineraal uit Katanga.* [On ianthinite, a new uranium mineral from Katanga.] Natuurwetenschappelijk Tijdschrift, Antwerpen, [1926], vol. 7 [for 1925], pp. 97-99. [Flemish.]

Small (to 2 mm.) black crystals with a violet tinge and semi-metallic lustre were found in veinlets in pitchblende from the Kasolo mine in Katanga, and are named ianthinite, from *ιάνθινος*, violet-coloured. The powder is brown-violet; H. 2-3. Under the microscope the rectangular orthorhombic plates show a micaceous cleavage (100) and give straight extinction; $\text{Bx}_a \perp (100)$, negative, optic axial plane (001), α 1.674, β 1.90, γ 1.92. The pleochroism is very strong: b dark-violet, c violet, a colourless. Chemical tests show the presence of water, uranium, and iron (probably as UO_2 and FeO). Analysis on a few mg. of pure crystals gave loss on ignition 15.85% (mostly water, but perhaps some gain of oxygen), Fe_2O_3 1.25, uranium oxide (82.90 by difference). The formula is given as $x\text{UO}_2.y\text{H}_2\text{O}$. The mineral is intimately associated with becquerelite ($\text{UO}_3.2\text{H}_2\text{O}$) into which it changes, and pseudomorphs of becquerelite after ianthinite are noted. L. J. S.

¹ See also 'Aramayoite', Min. Mag., 1926, vol. 21, p. 156.

BILLIET (Valère). *Over de bepaling van becquereliet, janthiniet, curiet, kasoliet, fourmarieriet, parsonsiet en dumontiet door middel van de immersie-methode van Becke.* [On the determination of becquerelite . . . and dumontite by means of the immersion method of Becke.] *Natuurwetenschappelijk Tijdschrift, Antwerpen*, [1926], vol. 7 [for 1925], pp. 112–116. [Flemish, with French résumé (p. 116).]

Refractive indices previously determined [Abstr., vol. 2; vol. 3, p. 6] for the new uranium minerals from the Kasolo radium mine, Katanga, are tabulated:

	α .	β .	γ .
Schoepite, $\text{UO}_3 \cdot 2\text{H}_2\text{O}$	1.690	1.714	1.735
Soddyite [= soddite], $12\text{UO}_3 \cdot 5\text{SiO}_2 \cdot 14\text{H}_2\text{O}$...	1.645	1.662	—
Dewindtite, $4\text{PbO} \cdot 8\text{UO}_3 \cdot 3\text{P}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$...	1.762	1.763	—
Sklodowskite, $\text{MgO} \cdot 2\text{UO}_3 \cdot 2\text{SiO}_2 \cdot 7\text{H}_2\text{O}$...	1.613	1.635	1.657

Others have higher values which could be determined only by immersion in: (1) Piperine containing dissolved SbI_3 (3 parts) and AsI_3 (1 part); a table shows the range of refractive index (for ordinary light) from 1.800 (with 37 % iodides) to 2.070 (with 80 % iodides). (2) Sulphur-selenium melts, n_{Li} 2.100 (with 37.5 % Se) to 2.716 (with 100 % Se). The results obtained are:

	α .	β .	γ .
Becquerelite, $\text{UO}_3 \cdot 2\text{H}_2\text{O}$, orthorhombic	1.750	1.87	1.88
Ianthinite, $x\text{UO}_2 \cdot y\text{H}_2\text{O}(?)$, orthorhombic	1.674	1.90	1.92
Fourmarierite, $\text{PbO} \cdot \text{UO}_3 \cdot \text{H}_2\text{O}$, orthorhombic	—	1.92	1.94
Curite, $2\text{PbO} \cdot 5\text{UO}_3 \cdot 4\text{H}_2\text{O}$, orthorhombic	—	2.07	2.12
Kasolite, $3\text{PbO} \cdot 3\text{UO}_3 \cdot 3\text{SiO}_2 \cdot 4\text{H}_2\text{O}$, monoclinic	1.89	1.90	—
Parsonsite, $2\text{PbO} \cdot \text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$, monoclinic	1.85	—	1.86
Dumontite, $2\text{PbO} \cdot 3\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$, orthorhombic	1.88	1.89	—

L. J. S.

MOROZEWICZ (J.). *O miedziankicie.*—*Sur la miedziankite.* *Spraw. Polsk.*

Inst. Geol. (Bull. Serv. Géol. Pologne), 1923, vol. 2, pp. 1–3. [Polish.]

— *Trois minéraux polonais.* *Compt. Rend. Congrès Géol. Intern.*, Session XIII (Belgique, 1922), 1926, vol. 3, pp. 1619–1621.

A mineral from the old copper mine at Miedzianka, central Poland, previously referred to tennantite [Abstr., vol. 2, p. 51], is now described under the name miedziankite, representing a variety of tennantite containing zinc. It is compact or granular and porous, with grey colour and feeble metallic lustre; H. 3–4, D. 4.700. Analysis by M. Karasiński, S 27.30, As 16.94, Sb 0.78, Bi 0.05, Cu 46.20, Ag 0.07, Zn 4.70, Pb 1.31, Fe 1.69, Co 0.31, insol. 0.10 = 99.45, gives the formula $2\text{Cu}_3\text{AsS}_3 \cdot \text{ZnS}$. The second paper repeats the descriptions of the new minerals staszicite and lubeckite [Abstr., vol. 2, pp. 51–52].

L. J. S.

[NENADKEVICH (K. A.) & VOLKOV (P. A.)] НЕНАДКЕВИЧ (К. А.) и ВОЛКОВ (П. А.). О новом минерале—тангейте из Тюямуяна.—NENADKEVIČ (K.) (NENADKEWITCH (K.)) et VOLKOV (P.). *La tanguéite—nouvelle espèce minérale des mines de Tjuja Moujoun en Ferghana*. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), Ser. A, 1926, pp. 43–46.

Two vanadates of copper have previously been described from Tyuya-Muyun in Fergana [Min. Mag., vol. 20, p. 287], namely 'Turkestan volborthite' (of I. A. Antipov, 1908; anal. I, also MoO_3 0.23) and turanite (K. A. Nenadkevich, 1909). New analyses are given of: II (also $\text{SrO} + \text{BaO}$ 1.24, SO_3 0.40, MoO_3 trace), a compact amorphous greenish-black mineral. III (also MgO trace), a radially fibrous vanadate forming dark olive-green botryoidal masses, found by A. E. Fersman in 1924. IV (H_2O at 105° 0.26 %, the remainder, 3.64 %, being firmly held), fibrous material much resembling turanite, occurring as spheroidal masses in crystalline limestone, as compact or porous dark-green masses, and in one case as a fibrous crust on red baryte.

	V_2O_5	CuO	CaO	SrO	U_3O_8	Fe_2O_3	Al_2O_3	SiO_2	H_2O	Total
I.	41.03	29.45	20.40	—	—	2.80		1.10	4.55	99.56
II.	38.53	26.92	19.89	—	3.67	2.08		2.45	4.71	99.89
III.	37.65	32.70	22.40		—	1.02	0.61	0.98	4.47	99.83
IV.	38.45	33.29	22.69	0.55	trace	0.10	0.50	0.20	3.90	99.68

Deducting impurities, all these analyses agree with the formula $2\text{CuO} \cdot 2\text{CaO} \cdot \text{V}_2\text{O}_5 \cdot \text{H}_2\text{O}$. For the crystalline varieties the name *tangeite*,¹ from the Tange gorge, is proposed, and for the colloidal variety the term 'Turkestan volborthite' is retained.

P. N. C.

KURBATOFF (Iwan). *Über [sic] Vanadiumverbindungen und das neue Mineral „Usbekit“ der radioaktiven Lager in Ferghana*. Centralblatt Min., Abt. A, 1926, pp. 345–353.

The vanadium minerals of Tyuya-Muyun and Kara-Chagyr in Fergana are contrasted, reference being made to the new mineral tangeite [preceding abstract]. Kolovratite [Abstr., vol. 2, p. 417] from Kara-Chagyr occurs as a fine powder disseminated in carbonaceous quartz-schist; analyses of green material gave I and of brown II. 'Usbekite'² occurs at Kara-Chagyr as a thin dark-green crust of minutely crystallized material in crevices in the quartz-schist; analysis of the portion soluble

¹ The name tangeite was given in a preliminary account of the mineral by A. E. Fersman, 'Priroda' [Nature], Leningrad, 1925, no. 7–9, col. 238.

² Узбекит [uzbekit] of A. E. Fersman, 'Priroda', Leningrad, 1925, no. 7–9, col. 238. There the formula is given as $4\text{CuO} \cdot \text{V}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.

in hydrochloric acid gave III, from which the formula $3\text{RO} \cdot \text{V}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$ is deduced.

	V_2O_5 .	CuO.	CaO.	NiO.	MgO.	$\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$.	SiO_2 .	H_2O .	H_2O . (hygro.).
I.	4.57	0.61	1.32	11.57	0.17	35.23	19.52	21.32	6.02
II.	16.08	0.74	1.19	9.16	0.11	29.40	17.96	16.29	8.59
III.	37.71	44.69	0.31	0.90	trace	1.40	1.17	12.82	0.53

L. J. S.

[LABUNTZOV (A. N.) Лабунцов (А. Н.). О титановом эльпидите из Хибинских тундр и его парагенезисе.—LABUNCOV (A.) (LABOUNTZOW (A.)). *Sur l'elpidite titanifère et sa paragenèse aux Monts Chibines en Laponie russe*. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), Ser. A, 1926, pp. 39–42.

This mineral was found in 1925 as brownish or rose-yellow growths in druses with albite in nepheline-syenite in the western part of the Yumegor pass in the Khibinsky tundra. The crystals are orthorhombic with the forms a (100), b (010), c (001), m (110), d (011), s (111), and angles bm $62^\circ 56'$, cd $44^\circ 15'$, cs $47^\circ 3'$ very close to those of elpidite from Narsarsuk in Greenland. The optical characters are, however, rather different from those of elpidite. The optic axial plane is (001) and the acute positive bisectrix normal to (100) with axial angle 42° – 43° (determined on the Fedorov stage in ordinary light) and distinct dispersion $\rho < \nu$; α 1.681, β 1.686, γ 1.698; pleochroism, α colourless, β yellow. Sp. gr. 2.533–2.560, H. $6\frac{1}{2}$. A partial analysis by I. D. Starynkevich-Borneman gave: SiO_2 much, $\text{ZrO}_2 + \text{TiO}_2$ about 20 % with $\text{Ti} > \text{Zr}$ [in elpidite ZrO_2 20.48, TiO_2 trace], FeO nil, $\text{MnO} > 1\%$, CaO nil, Na_2O much, H_2O 9.1 %. The mineral therefore differs from elpidite in containing Ti in place of Zr, and it is called *titaniferous elpidite* (титановый эльпидит). In a table are listed 33 associated minerals occurring in the outer zone of the Khibinsky massif, and this association is compared with the minerals of Narsarsuk in Greenland. Amongst the former titanium minerals (astrophyllite, ilmenite, loparite, neptunite, ramsayite, rinkite, eucolite, titaniferous elpidite, and aenigmatite) predominate, whilst at Narsarsuk zirconium minerals are more abundant.

P. N. C.

FERSMAN (A. E.). *Minerals of the Kola Peninsula*. Amer. Min., 1926, vol. 11, pp. 289–299.

FERSMANN (A. E.). *Die Mineralien der Chibina- und Lujavr-Tundren auf der Halbinsel Kola*. Neues Jahrb. Min., Abt. A, 1926, Beil.-Bd. 55, pp. 36–46, 1 pl., 3 tables.

A summary of previous papers [Abstr., vol. 2, pp. 250, 261–264, 381, 398, 406–408; vol. 3, pp. 102–103, 111] describing the minerals from

the two massifs of nepheline-syenite in the districts known as 'Hibina- (or Umptek), and Lujavr-Toundra (or Lujavr-urt)'. The following details have not previously been given in these abstracts. Astrophyllite as large golden-yellow plates in masses of 10 kg.; partial analysis I by K. Beloglasov. Eucolite, anal. II by I. D. Starynkevich-Borneman. Lamprophyllite as poor crystals 20 cm. long and stellate groups, very similar to astrophyllite in appearance; anal. III by K. Beloglasov. Leparite as black pseudo-cubic interpenetration twins; sp. gr. 4.77, H. $5\frac{1}{2}$; anal. IV by I. Knipovich. Murmanite [Abstr., vol. 2, p. 263], a violet scaly mineral with micaceous cleavage; optically biaxial with $a \perp$ cleavage, β 1.735, H. 2-3; anal. V by I. D. Starynkevich-Borneman shows it to be a titano-zircono-silicate of Na, Fe, Mn, Ca. *Rinkolite*, belonging to the mosandrite-rinkite group [and previously referred to rinkite, Abstr., vol. 2, p. 262], is common as yellowish-green bladed monoclinic crystals up to 20 cm. long; sp. gr. 3.40, H. 5; $\beta = b$, $a : c = 1\frac{1}{2}^\circ - 3\frac{1}{2}^\circ$, $2V$ $45^\circ - 88^\circ$, α 1.643 (1.662), β 1.645 (1.667), γ 1.651 (1.681); anal. VI by K. A. Nenadkevich. *Lovchorrite* a brown colloidal variety of rinkolite is found as 'masses weighing hundreds of kilograms'; sp. gr. 3.32, H. 5, n 1.653; anal. VII by I. D. Starynkevich-Borneman. *Titano-elpidite* [see preceding abstract, titaniferous elpidite].

	I.	II.	III.	IV.	V.	VI.	VII.
SiO ₂ ...	40.26	48.05	27.66	0.47	29.13	27.58	27.61
TiO ₂ ...	1.92	3.13	20.83	50.24	37.33	11.15	12.71
ZrO ₂ ...	12.72	8.97	12.40	0.04	2.00	0.35	0.20
Ce ₂ O ₃ ...	—	2.54	0.50	33.17	—	18.02	8.79*
Yt ₂ O ₃ ...	—	—	—	1.54	—	—	1.36†
Al ₂ O ₃ ...	—	—	0.52	—	—	1.47	0.13
Fe ₂ O ₃ ...	26.43	—	2.89	—	—	0.99	—
FeO ...	—	6.15	—	—	1.84	—	—
MnO ...	8.28	2.91	1.99	—	2.92	trace	0.53
MgO ...	2.42	1.67	0.20	—	0.75	trace	0.80
CaO ...	1.68	10.33	1.81	5.08	2.10	24.70	27.26
SrO ...	—	—	8.40	—	—	3.30	3.56
BaO ...	—	—	6.75	—	—	trace	—
Na ₂ O ...	—	12.43	14.00	8.60	14.94	6.73	7.18
K ₂ O ...	—	0.89	1.42	0.43	—	0.16	0.28
Cl ...	—	1.32	—	—	—	—	—
F ...	—	—	—	—	—	5.99	6.38
H ₂ O ...	—	0.50	0.67	—	8.92	1.75	0.51
Total ...	93.71	98.89	100.04	99.57	99.93	102.19	102.63

* CeO₂ 8.79, ThO₂ 0.23.

† (Di,La)₂O₃ 5.15.

[PETRUSHKEVICH (O. A.)] Петрушкевич (О. А.). О новой минеральной разновидности из группы диаспора. [*On a new mineral variety of the diaspora group.*] Бюллетени Геолого-Минералогического Круга при Екатеринбургском Горном Институте [Bull. Geol.-Min. Circle, Ekaterinoslav Mining Institute], 1926, no. 2, pp. 17-20.

The mineral occurs in crevices in chromite near the settlement Kairakty, prov. Turgai [now govt. Kustanaisk], Russian Central Asia, where chromite masses (up to $21 \times 3-5$ metres) in talc-schist and chlorite-schist are mined. Associated minerals are chrome-tourmaline, topaz [?], periclase, fuchsite, and uvarovite. Analysis gave Al_2O_3 74.25, Fe_2O_3 1.44, Cr_2O_3 nil, MgO 1.72, CaO 3.09, SiO_2 3.72, H_2O 15.02 = 99.24. Sp. gr. 3.385, H. $6\frac{1}{2}$. The mineral is monoclinic, since sections cut perpendicular to the acute positive bisectrix give extinction angles up to 30° measured to the traces of the perfect cleavage. $2V$ $51^\circ-60^\circ$, α 1.70, γ 1.75. The sign of the elongation is negative, and the heating curve shows a break at 550° , the mineral agreeing in these characters with diaspora. For this mineral the name *tanatarite* is proposed, after Professor Josef Tanatar of the Ekaterinoslav Mining Institute. [Cf. kayserite, Abstr., vol. 2, p. 12.] P. N. C.

ZAMBONINI (Ferruccio) & CONIGLIO (Luca). *Sulla presenza, in alcuni prodotti dell'attuale attività del Vesuvio, di quantità notevoli di composti di cesio.* Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1926, ser. 6, vol. 3, pp. 521-524.

ZAMBONINI (Ferruccio). *Sulla presenza, tra i prodotti dell'attuale attività del Vesuvio, di una varietà cesifera del fluoborato di potassio.* Tom. cit., pp. 644-649, 6 figs.

A yellowish to reddish saline sublimation on lava, collected in November 1924 from the floor of the crater of Vesuvius, when examined spectroscopically showed strong lines of caesium. The solution in cold (slightly acidified) water contained chlorides and sulphates with boron and fluorine, and small quantities of Cu, Pb, Ti [cf. Abstr., vol. 3, p. 104], Fe, Al, Ca, Mg, Na, K, Cs. The soluble portion gave Cs 11.5 %, K 19.4 %, estimated as chloroplatinates. Material from another part of the same specimen contained Cs 7 %, K 15.2 %. Rubidium is absent. The only known mineral containing more than this amount of caesium is pollucite.

Orthorhombic plates isolated from the minutely crystallized mixture of salts agree in their microscopical characters with the recorded data for potassium fluoborate, KBF_4 ; and spectroscopically they were found to

contain B, K, and Cs. This new mineral is named *avogadrite*, after Amedeo Avogadro [1776–1856], who wrote the first complete treatise on crystallography in Italian. Better measurements were obtained from material re-crystallized from the aqueous solution. The tabular crystals are of the baryte habit (BaSO_4 ; also KMnO_4 and KClO_4) with the forms $c(001)$, $m(110)$, $n(011)$, $d(102)$, $o(111)$, $a(100)$, and gave angles $cn\ 52^\circ\ 3'$, $nm\ 76^\circ\ 39'$, &c., agreeing closely with those for KBF_4 ($a:b:c = 0.7898:1:1.2830$, L. Brugnatelli, 1894). The optic axial plane is (010) and the acute negative bisectrix $\perp (001)$, $2E$ large, n about 1.326 (less than that of water), birefringence weak; sp. gr. 2.617. These values compared with new determinations made on artificial KBF_4 ($\alpha\ 1.3239$, $\beta\ 1.3245$, $\gamma\ 1.3247$ (N_a); sp. gr. 2.505) and CsBF_4 ($n_{Na}\ 1.36$; sp. gr. 3.305) indicate that the crystals of *avogadrite* contain KBF_4 90.5 % and CsBF_4 9.5 %.

L. J. S.

CAROBBI (G.). *Nuove ricerche sopra alcune notevoli sublimazioni vesuviane*. Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1926, ser. 6, vol. 4, pp. 382–384, 2 figs.

A sublimation collected from the floor of the crater of Vesuvius contained 38.8 % B_2O_3 in the soluble portion, and when examined microscopically showed minute hexagonal scales of sassoline and tabular orthorhombic crystals which were found spectroscopically to contain potassium and boron. The latter after re-crystallization give sp. gr. 2.498, $n_{Na}\ 1.325$, and it is concluded that the material is pure *avogadrite* (KBF_4).

L. J. S.

ZAMBONINI (Ferruccio) & CAROBBI (Guido). *Sulla presenza del fluosilicato sodico e di quello di potassio tra i prodotti dell'attuale attività del Vesuvio*. Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1926, ser. 6, vol. 4, pp. 171–175.

Material collected in 1924 from fumaroles on Vesuvius contained *avogadrite* free from caesium (KBF_4 ; preceding abstract), together with potassium fluosilicate, K_2SiF_6 (hieratite), and sodium fluosilicate, Na_2SiF_6 , the last being named *malladrite*. Hieratite, previously known only from Vulcano, has the form of minute optically-isotropic cubes with $n_{Na}\ 1.340$. Malladrite forms small hexagonal prisms, sometimes with pyramidal or basal planes, with weak negative birefringence and $n\ 1.31$ about (less than that of water). By re-crystallizing the material good prismatic or tabular crystals were obtained, which gave $(10\bar{1}0):(10\bar{1}1) = 57^\circ\ 0'$, $\epsilon_{Na}\ 1.309$, $\omega_{Na}\ 1.312$. The re-crystallized material shows regular

growths of cubic K_2SiF_6 on hexagonal Na_2SiF_6 . Another fluosilicate ($[NH_4]_2SiF_6$, cryptohalite) was observed on Vesuvius by E. Scacchi in 1874.

L. J. S.

ZAMBONINI (F.) & CAROBBI (G.). *Sulla presenza, tra i prodotti dell'attuale attività del Vesuvio, del composto $Mn_2K_2(SO_4)_3$* . Gazzetta Chimica Italiana, 1925, vol. 55, pp. 414-416. [See Abstr., vol. 2, p. 382; vol. 3, p. 105; Manganolangbeinite.]

HESS (Frank L.) & FOSHAG (W. F.). *Carnotite from Colorado; and rossite, a new calcium vanadate from Utah*. Amer. Min., 1926, vol. 11, p. 66 (Abstract of paper read before Min. Soc. Amer., Dec. 1925).

Carnotite as coarse platy crusts on sandstone gave on analysis the formula $K_2O \cdot 2UO_3 \cdot V_2O_5 \cdot \frac{2}{3}H_2O$; α 2.06, γ 2.08, $2V$ 50°. Rossite is triclinic with the composition $CaO \cdot V_2O_5 \cdot 2-4H_2O$.

L. J. S.

WRIGHT (Fred E.) & ALLEN (E. T.). *Curtisite, a new organic mineral from Skaggs Springs, Sonoma County, California*. Amer. Min., 1926, vol. 11, p. 67. (Abstract of paper read before Min. Soc. Amer., Dec. 1925.)

A greenish deposit from a hot spring emitting inflammable gas was collected by P. L. Curtis and gave on analysis by F. B. LaForge, C 92.36, H 5.52, O 2.12, corresponding with $C_{60}H_{40}O$. It is soluble in hot benzene and in hot pyridine, and melts with some decomposition above 350°C. Sp. gr. 1.21, H. < 2. The optical characters suggest orthorhombic (or possibly monoclinic) symmetry. The optic axial plane is normal to a poor cleavage (100), and the acute positive bisectrix normal or nearly normal to a perfect cleavage (001); α 1.577, β 1.734, γ 2.07 (Na), $2V$ 83½°.

L. J. S.

HAHN (F.-V. v.). *Ueber ein proteinartiges Gel in den Kieselgur lagern der Lüneburger Heide*. Kolloid-Zeits., 1925, vol. 37, pp. 300-303. [See Cornuite, Abstr., vol. 3, p. 114.]

Mathematical Crystallography.

ROGERS (Austin F.). *A mathematical study of crystal symmetry*. Proc. Amer. Acad. Arts Sci., 1926, vol. 61, pp. 161-203, 48 figs.

A discussion is given of the mathematical properties of the thirty-two classes of crystalline symmetry with criticisms of the work of other authors, and plentiful references to the literature of the subject.

H. H.

RINNE (Friedrich). *Ein stereographisch-gnomonisches Netz.* Ber. Verh. Sächs. Akad. Wiss. Leipzig, Math.-Phys. Kl., 1925, vol. 77, pp. 135-136, 1 pl.

A diagram is given consisting of a square with an edge of about 35 cm. in the centre of which is inserted a Wulff stereographic net of radius 10 cm. This net shows the projection of the lines of latitude and longitude to every two degrees on to a plane touching the sphere at a point of the equator. The space between this circular net and the square is divided up protractor-wise by 360 lines radiating from the centre. A linear scale is added, which gives the angular distance from the centre of the net when gnomonic projection is used instead of stereographic. H. H.

[ROMANOV (S. M.)] Романов (С. М.). О лучшем использовании сетки Г. В. Вульфа при решении кристаллографических и космографических задач. ROMANOV (S.). *Sur la meilleure utilisation du canevas stéréographique de G. Wulff pour la solution des problèmes crystallographiques et cosmographiques.* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1925, ser. 2, vol. 52, pp. 440-480, 7 figs.

Describes simpler and quicker methods for the solution of various problems with the aid of stereographic net. For example, in the construction of an ellipse on a sphere the number of operations is reduced from 230 to 50. P. N. C.

DOLIVO-DOBROVOLSKY (V. V.) Доливо-Добровольский (В. В.). Исследование додекаэдро-икосаэдрической системы.—*Recherches sur le système dodécaèdre icosaédrique.* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1925, ser. 2, vol. 52, pp. 169-181, 13 figs.

The construction and symmetry of the eight possible polyhedra in this group are described and illustrated. These are (1) regular icosahedron, with 20 faces; (2) regular [pentagonal]-dodecahedron, 12 faces; (3) pentagonal-triicosahedron, 60 faces; (4) rhombic triicosahedron, 30 faces; (5) pentadodecahedron, 60 faces; (6) trigonal-triicosahedron, 60 faces; (7) tetragonal-triicosahedron, 60 faces; (8) hexaicosahedron, 120 faces. P. N. C.

[ШУБНИКОВ (А.)] Шубников (А.). К вопросу о заполнении пространства многогранниками без промежутков. ШОУБНИКОВ (А.). *Sur la question du remplissement continu de l'espace par les polyèdres.* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1924, ser. 2, vol. 53, pp. 193-198 (French résumé, p. 198), 2 figs.

For n -dimensional space completely filled with polyhedra the formula $p_0 - p_1 + p_2 - p_3 + \dots \pm p_n = 0$ is given. For three-dimensional space

this reduces to $p_0 - p_1 + p_2 - p_3 = 0$, when p_0 is the number of apices, p_1 the number of edges, p_2 the number of faces, and p_3 the number of polyhedra. This formula is analogous to that of Euler for closed n -dimensional polyhedra: $p_0 - p_1 + p_2 - p_3 + \dots \pm p_{n-1} = 1 - (-1)^n$. P. N. C.

[BOLDYREV (A. K.)] Болдырев (А. К.). Существуют ли зеркально-поворотные оси симметрии (оси сложной симметрии) нечетного наименования? — BOLDIREV (A.). *Y-a-t-il des axes de la symétrie de rotation-reflexion (de symétrie alterne) qui sont des axes d'ordre impair?* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1923, ser. 2, vol. 51, pp. 397-414, 5 figs.

The author discusses the commonly accepted views as to the impossibility of odd-order symmetry-axes of rotatory-reflection. He brings into prominence more than is usually done two properties of rotation and rotatory-reflection axes, namely their property (1) of including axes of lower symmetry, (2) of splitting up completely into axes of lower symmetry. P. N. C.

[BOLDYREV (A. K.)] Болдырев (А. К.). Косые зеркально-поворотные оси симметрии.—BOLDIREV (A.). *Les axes obliques de symétrie de rotation-reflexion.* Зап. Росс. Мин. Общ. (Mém. Soc. Russe Min.), 1923, ser. 2, vol. 51, pp. 415-423, 3 figs.

A mathematical treatment in which it is shown that equivalent operations may sometimes be used with advantage. For example, (1) instead of a double reflection in a pair of faces, rotation may be used, or (2) the reverse. (3) Instead of double reflection in one pair of faces the same in another pair of faces (i.e. rotation of the pair of faces).

P. N. C.

WEISSENBERG (K.). *Dynaden und Inseln im Kristall.* Zeits. Krist., 1926, vol. 63, p. 221.

Two dynads [Abstr., vol. 3, p. 16] taken arbitrarily in the crystal have either no particle in common or all particles of one in common.

H. H.

SCHOENFLIES (A.). *Über K. Weissenbergs neuere kristallographische Arbeiten.* Zeits. Krist., 1926, vol. 63, pp. 193-220, 5 figs.

The theory of crystal-structure and groups of movements is summarized with the object of pointing out the importance of Weissenberg's concepts of particle-group and dynad. The particle-group consists of a system of particles, which is transformed into itself by a sub-group of the symmetry-group of the medium, while every other movement of this

space-group transforms it into some totally different system. The dynad is composed of a system of atoms bound together by forces stronger than those linking them to other atoms of the medium. A list is added of errata in the author's 'Lehrbuch der Kristallstruktur'. H. H.

NIGGLI (Paul). *Die regelmäßige Punkverteilung längs einer Geraden in einer Ebene.* Zeits. Krist., 1926, vol. 63, pp. 255-274, 4 figs.

All possible space-movements are considered which bring to self-coincidence both a line and a system of points lying in a plane containing the line. Seven types of such symmetry are differentiated. H. H.

HAAG (F.). *Borten und Bänder.* Zeits. Krist., 1926, vol. 64, pp. 309-310, 7 figs.

Diagrams are given to illustrate a point in Niggli's paper [preceding abstract] on symmetric division of the plane. H. H.

BAUMHAUER (H.) [1848-1926]. *Beitrag zur vergleichenden Kristallographie.* Schweiz. Min. Petr. Mitt., 1925, vol. 5, pp. 348-426, 30 figs.

The subject of the paper is the manner in which crystal-faces combine to form zones, and the zones in turn to form the whole crystal. The author summarizes the development of faces in the minerals galena, magnetite, binnite, pyrite, idocrase, anatase, sulphur, beryllonite, aragonite, strontianite, cerussite, baryte, celestine, anglesite, topaz, stibnite, humite, clinohumite, beryl, apatite, calcite, quartz, stephanite, and jordanite. He finds that 'primary series' of zonal faces in which indices rise uniformly, such as (130) (131) (132) (133) (134) (135) (001), are more common than the 'normal series' such as (100) (310) (210) (320) (110) (230) (120) (130) (010), in which the indices of each face are the sum of the indices of the two adjacent faces in the series. H. H.

TOKODY (L.). *Über zwei neue Persistenzwerte.* Zeits. Krist., 1926, vol. 64, pp. 160-163.

The 'locality-persistence' of a crystal-form is a hundred times the ratio of the number of places in which the crystal-form is found to the total number of places in which the mineral occurs. Similar 'persistence-values' are the percentage of places at which twins occur, and the percentage of places at which crystals twinned on a given law occur. These values give a scientific meaning to the 'importance of a specified law of twinning' and to the 'readiness of a crystal to form twins'. H. H.

MACHATSCHKI (Felix). *Über die Beziehungen zwischen den Flächenwinkeln und Kennziffern der Flächen bestimmter Paare von allgemeinen Prismen im tetragonalen, tesseralen und hexagonalen System.* Zeits. Krist., 1926, vol. 64, pp. 314-317, 2 figs.

In the tetragonal system to each prism-form corresponds a second such that, if both occur on the same crystal, they give rise to a pseudo-octagonal symmetry. If a face of one form is given, a face of the other is obtained on replacing its two non-zero indices by their sum and difference. Similar results hold for the hexagonal system. H. H.

X-rays and Crystal-structure.

TOKODY (László). *A kristályok belső szerkezete és annak megállapítása.* [The internal structure of crystals and its determination.] A „Technika“ Magyar Mérnökök Lapja [Journ. Hungarian Engineers], Budapest, 1926, no. 1-2, pp. 1-11, 29 text-figs.

This article, intended for general readers, gives a short introduction to the symmetry and systems of crystals, and an outline of the various Röntgen-ray methods (of Laue, Bragg, Debye-Scherrer, Hadding) of investigating the symmetry and the atomic and molecular structure of crystals. K. Z.

LAUE (M. v.). *Lorentz-Faktor und Intensitätsverteilung in Debye-Scherrer-Ringen.* Zeits. Krist., 1926, vol. 64, pp. 115-142, 4 figs.

A mathematical investigation of the intensity of the X-ray interference phenomena, firstly for the case of a single crystal in Röntgen rays of a definite wave-length, and secondly for the case of a crystalline powder, showing how the nature of the crystal-particles may be deduced from the breadth of the interference rings. H. H.

OWEN (E. A.) & PRESTON (G. D.). *The effect of rolling on the crystal structure of aluminium.* Proc. Physical Soc. London, 1926, vol. 38, pp. 132-147, 2 pls., 12 text-figs.

Sheets of aluminium have been examined by the ionization spectrometer and by photographic methods, with a view to discriminating between two contradictory results obtained by previous observers with the photographic method as to the final orientation of crystals in rolled material. The results show that, when a cast specimen of aluminium containing a number of large crystals oriented at random throughout the body of the material is rolled, the crystals break up into a large number of minute crystals. As the thickness of the material is progressively

diminished, the small crystals tend to take up a definite orientation, each crystal having a cube diagonal in the direction of rolling and a (211) plane in the plane of rolling. Two sets of crystals exist in the material after rolling, the one being the optical image of the other in the plane of rolling. The observations obtained by the ionization spectrometer indicate that the type of the space-lattice remains unaltered, and that the parameter of the material in the severely worked condition does not differ from that of the annealed material by more than 0.5 %. [AUTHOR'S ABSTRACT.] H. E. B.

WESTGREN (Arne) & PHRAGMÉN (Gösta). *Zum Kristallbau des Mangans*. Zeits. Physik, 1925, vol. 33, pp. 777-788. 2 figs.

Three modifications of metallic manganese are herewith included, viz. α , β , and γ . α -manganese is stable at ordinary temperatures and is cubic with 56 atoms per unit cell and $a = 8.894 \pm 0.005 \text{ \AA}$.; the corresponding density is 7.21. β -manganese is cubic with 20 atoms in the unit cell of length $a = 6.289 \pm 0.004 \text{ \AA}$., and density 7.29. Electrolytic γ -manganese is tetragonal face-centred, with four atoms in the cell $a = 3.774$, $c = 3.533 \pm 0.003 \text{ \AA}$., $c/a = 0.937$, and with a density of 7.21. When carbon is dissolved in the last (γ) lattice it is found to penetrate the structure and not to effect substitution. H. E. B.

LEVI (G. R.) & HAARDT (R.). *Struttura cristallina del rutenio e dell'osmio*. Rend. R. Ist. Lombardo Sci. Lett. 1926, vol. 59, pp. 208-214, 1 pl.

Hull's work on these metals is here under revision and the results are in substantial agreement with his.

Ru $a = 2.680$, $c = 4.261 \text{ \AA}$., with $c/a = 1.59$.

Os $a = 2.714$, $c = 4.816 \text{ \AA}$., with $c/a = 1.59$.

Both structures are hexagonal close-packed.

H. E. B.

ARKEL (A. E. van). *Over den bouw van mengkristallen*. Physica, Nederlandsch Tijdschrift voor Natuurkunde, Eindhoven, 1926, vol. 6, pp. 64-69, 1 pl., 2 text-figs. Dutch, with English summary (p. 69).

A study of the mixtures W-Mo shows that the change from a pure tungsten lattice ($a = 3.157$) to a pure molybdenum lattice ($a = 3.140$), from a comparison of X-ray photographs, is a continuous function of the percentages of the ingredients. H. E. B.

OSAWA (Atomi). *The relation between space-lattice constant and density of iron-nickel alloys.* Sci. Rep. Tôhoku. Univ. Sendai, Ser. I (Math. Physics, Chem.), 1926, vol. 15, pp. 387-398, 1 pl., 4 text-figs.

OSAWA (Atomi). *On the relation between the lattice constant and the density of iron-nickel alloys.* Journ. Iron and Steel Inst. London, 1926, vol. 113 (no. 1 for 1926), pp. 447-456, 2 pls., 4 text-figs.

The lattice constant, density, and hardness were determined for a complete series of iron-nickel alloys after annealing at 1150°C . and after immersion in liquid air. With 0-33 % Ni the lattice is body-centred cubic ($a = 2.865$ to $2.877 \text{ \AA}$., respectively). From 12 to 100 % Ni the lattice is face-centred cubic ($a = 3.600$ to $3.538 \text{ \AA}$., respectively). Between 12 % and 33 % Ni both structures are shown. The addition of nickel to iron increases the hardness, with a maximum at 21 % Ni for annealed samples and 27 % Ni for cooled samples. L. J. S.

DEHLINGER (U.) & GLOCKER (R.). *Die Kristallstruktur des Calcium-carbides.* Zeits. Krist., 1926, vol. 64, pp. 296-302, 5 figs.

Calcium carbide has a cubic unit cell with edge of length $5.73 \text{ \AA}$. containing four molecules of CaC_2 . The space-group is one of T_h^2 , O^2 , O_h^4 . The structure is of the cuprite type with the copper atoms replaced by calcium and the oxygen atoms by the centre of a tetrahedron with four carbon atoms at its vertices. H. H.

CLAASSEN (A.). *The crystal structure of the anhydrous alkali monosulphides. I.* Recueil Trav. Chim. Pays-Bas, 1925, vol. 44, pp. 790-794.

Sodium sulphide, Na_2S , and lithium sulphide, Li_2S , are cubic with dimensions, a , 6.53 and $5.70 \text{ \AA}$. respectively; the arrangement of atoms resembles that of Ca and F_2 atoms in the fluorite structure. H. E. B.

HAVIGHURST (R. J.). *Präzisionsmessungen der Gitterkonstanten einiger Alkali- und Ammoniumhalogenide.* Zeits. Krist., 1926, vol. 64, p. 164.

Measurements of the edge of the fundamental cell for various salts were made with a high degree of accuracy using the Debye-Scherrer method, and taking NaCl as a standard. In Ångström units were obtained: NaCl 5.628 , KCl 6.280 , KBr 6.578 , KI 7.052 , RbCl 6.571 , RbBr 6.868 , RbI 7.325 , CsCl 4.110 , NH_4Cl 3.866 , NH_4Br 4.047 , NH_4I 7.244 . H. H.

FERRARI (A.). *I reticoli cristallini dei fluoruri di litio e magnesio e il loro isomorfismo*. Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1925, ser. 6, vol. 1, pp. 664-671, 3 figs.

Lithium fluoride is cubic, with a rock-salt arrangement of atoms and $a = 4.033 \text{ \AA}$. Magnesium fluoride is tetragonal with a structure similar to rutile, $a = 4.64$, $c = 3.06 \text{ \AA}$, $c/a = 0.66$. The unit volumes of these two fluorides are almost equal, thus a^3 , containing $4\text{LiF} = 65.55$, and a^2c , containing $2\text{MgF}_2 = 65.85$. This may account for the ready formation of mixed crystals. H. E. B.

MARK (H.) & STEINBACH (J.). *Über das Raumgitter und die Doppelbrechung des Kalomel*. Zeits. Krist., 1926, vol. 64, pp. 79-112, 2 figs.

Calomel has an elementary tetragonal cell with dimensions $a = 4.45$, $c = 10.89 \text{ \AA}$, containing four molecules of HgCl_2 . The space-group is D_{4h}^{11} . The values of the double refraction found by H. de Senarmont (1868) and H. Dufet (1898) are compared with that calculated from the structure in accordance with the theoretical investigations of M. Born's 'Dynamik der Kristallgitter' (1915 and 1923). A satisfactory agreement between theory and experiment is obtained, but further investigation is needed. H. H.

HASSEL (O.). *Röntgenographische Untersuchung des tetragonal kristallisierenden Quecksilberzyanids*. Zeits. Krist., 1926, vol. 64, pp. 217-223.

Crystals of mercury cyanide of acicular habit were investigated by the X-ray rotation method. They belong to the space-group V_d^{12} and the unit cell, $a = 9.67$, $c = 8.92 \text{ \AA}$, contains eight molecules of $\text{Hg}(\text{CN})_2$. H. H.

JAEGER (F. M.), TERPSTRA (P.) & WESTENBRINK (H. G. K.). *Over de kristalstructuur van het germaniumtetraiodide*. Verslag Afd. Natuurk. K. Akad. Wetensch. Amsterdam, 1925, vol. 34, pp. 721-740, 6 figs.

— — — *On the crystalstructure of germanium-tetraiodide*. Proc. Sect. Sci. K. Akad. Wetensch. Amsterdam, 1925, vol. 28, pt. 2, pp. 747-766, 6 figs.

Measurements on small crystals obtained from solution in benzene show that the symmetry of this cubic crystal is T_4 or T_h . X-ray investigations have been carried out and it is shown that there are eight molecules GeI_4 in the unit cube of length $11.89 \text{ \AA}$. The symmetry is that of space-group T_h^c , the germanium atoms having an arrangement like the sulphur

atoms in pyrite, while iodine atoms are tetrahedrally disposed around each germanium atom. The structure is analogous to R. G. Dickinson's structure for tin tetraiodide [Abstr., vol. 2, p. 201]. H. E. B.

TERPSTRA (P.) & WESTENBRINK (H. G. K.). *Over de kristalstructuur van loodjodide*. Verslag Afd. Natuurk. K. Akad. Wetensch. Amsterdam, 1926, vol. 35, pp. 75-86, 1 table, 7 figs.

——— *On the crystal-structure of lead-iodide*. Proc. Sect. Sci. K. Akad. Wetensch. Amsterdam, 1926, vol. 29, pp. 431-442, 1 table, 7 figs.

Lead iodide has a structure resembling that of cadmium iodide (R. M. Bozorth, Journ. Amer. Chem. Soc., 1922, vol. 44, p. 2232). The lattice dimensions are $a = 4.54$, $c = 6.86$ Å., with one molecule PbI_2 in the unit cell. Actual crystal measurements showed the angle $(10\bar{1}1)(0001)$ to be $60^\circ 20'$, corresponding to an axial ratio of 1.51. The space-group is D_{3d}^2 or, equally, D_{3d}^3 . H. E. B.

BIJVOET (J. M.), CLAASSEN (A.) & KARSEN (A.). *De kristalstructuur van rood mercuri-jodide*. Verslag Afd. Natuurk. K. Akad. Wetensch. Amsterdam, 1926, vol. 35, pp. 111-128, 2 figs.

——— *The crystal structure of red mercuric iodide*. Proc. Sect. Sci. K. Akad. Wetensch. Amsterdam, 1926, vol. 29, pp. 529-546, 2 figs.

Using the method of the rotating crystal the following structure for red HgI_2 is obtained: a tetragonal arrangement based upon D_4^{15} , with $a = 4.38$, $c = 12.43$ Å. There are two molecules of HgI_2 in this unit with co-ordinates Hg (000) and $(\frac{1}{2}\frac{1}{2}\frac{1}{2})$; I $(0\frac{1}{2}v)$, $(0.\frac{1}{2}.v+\frac{1}{2})$, $(\frac{1}{2}0\bar{v})$ and $(\frac{1}{2}.0.\frac{1}{2}-v)$, where $v = \frac{50 \pm 2\frac{1}{2}}{360}$.

Each Hg atom is surrounded nearly tetrahedrally by four iodine atoms. [Work by A. Claassen at Manchester University gave $a = 4.357$, $c = 12.36$ Å., to 0.1 %.] H. E. B.

ARKEL (A. E. van). *Über die Kristallstruktur der Verbindungen Mangunfluorid, Bleijodid und Wolframsulfid*. Recueil Trav. Chim. Pays-Bas, 1926, vol. 45, pp. 437-444.

Manganese fluoride, MnF_2 , is similar to rutile, with $a = 4.885$, $c = 3.295$ Å. Lead iodide, PbI_2 , has a structure like cadmium iodide (rhombohedral), with $a = 4.59$, $c = 7.02$ Å. Tungsten sulphide, WS_2 , is similar to molybdenum sulphide, with $a = 3.18$, $c = 12.5$ Å., in the unit hexagonal prism. H. E. B.

MARK (H.) & POHLAND (E.). *Zur Kristallstruktur des festen Kohlendioxyds*. Zeits. Krist., 1926, vol. 64, pp. 113-114.

The authors' experiments on solid CO₂ were repeated in view of the fact that they had obtained a distance 1.59 Å. between the C and O atoms against 1.055 Å. obtained by W. H. Keesom and J. de Smedt [Abstr., vol. 3, p. 20]. They obtained a distance between 1.1 and 1.15 Å., in close agreement with Keesom and de Smedt and with H. Krüner [Abstr., vol. 3, p. 184], who found 1.05 Å. H. H.

HENDRICKS (S. B.) & PAULING (Linus). *Die Struktureinheit und Raumgruppensymmetrie von β-Aluminiumoxyd*. Zeits. Krist., 1926, vol. 64, pp. 303-308.

Spectrum and Laue experiments on β-aluminium oxide of density 3.30 gave for the structure a unit hexagonal cell with $a = 5.60$ and $c = 22.414$ Å. containing twelve molecules of Al₂O₃. The crystal belongs to one of the space-groups D_{3h}^4 , C_{6v}^4 , D_{6h}^4 , but it proved impossible to discriminate between them or to find how the atoms were arranged. H. H.

FERRARI (A.). *L'esame röntgenografico dei reticoli cristallini del fluoruro manganoso e del biossido di manganese*. Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1926, ser. 6, vol. 3, pp. 224-230.

The structures of MnF₂ and MnO₂ are very similar, the author finding a rutile arrangement to fit the X-ray data in each case. Dimensions of a cell containing two molecules are:

	a .	c .	c/a .	D(calc.).
MnF ₂ ...	... 4.865 Å.	3.284 Å.	0.675	3.97
MnO ₂ ...	... 4.380	2.856	0.625	5.27

The manganese dioxide examined was a crystalline specimen of polianite from Platten, Bohemia. Pyrolusite from various localities and prepared manganese dioxide also gave the same structure. The conclusion is drawn that polianite is the only crystalline form of MnO₂ and that pyrolusite is a pseudomorph after the orthorhombic manganite.

H. E. B.

FONTANA (C.). *Struttura dell'ossido manganoso*. Gazz. Chim. Ital., 1926, vol. 56, pp. 396-397.

This is a revision of a previous paper by G. R. Levi [Abstr., vol. 3, p. 21], on account of improvement in method. The same results are indicated as in the previous paper. H. E. B.

LEVI (G. R.) & TACCHINI (G.). *Sulla non esistenza del sottossido di nichelio*. Gazz. Chim. Ital., 1925, vol. 55, pp. 28-32, 1 pl., 1 text-fig.

Suboxides of nickel, having proportions of metal and oxygen varying between pure Ni and NiO, have been tested, with particular reference to a substance obtained by the reduction of Ni_3O_4 in hydrogen at 240-250°C. with a composition corresponding to Ni_2O . All show lines corresponding to the pure Ni and NiO structures and to nothing else. H. E. B.

LEVI (Giorgio Renato) & NATTA (Giulio). *Sulla struttura degli ossidi piomboso e stannoso*. Rend. R. Ist. Lombardo Sci. Lett., 1926, ser. 2, vol. 59, pp. 303-320, 1 pl., 10 text-figs.

——— *Isomorfismo degli ossidi piomboso e stannoso*. Nuovo Cimento, 1926, n. ser., vol. 3, pp. 114-134, 1 pl., 10 figs.

In a previous paper [Abstr., vol. 2, p. 513] the structure of PbO and SnO were described as crystallizing on a tetragonal 'rock-salt' arrangement. In view of the work of Dickinson and Friauf [Abstr., vol. 2, p. 514] the authors have revised their work and as a result have made a slight modification of the c axis parameter. There is very little agreement between their structure and that of Dickinson and Friauf.

H. E. B.

BASCHE (W.) & MARK (H.). *Über die Struktur von Verbindungen des Typus MeXO_4* . Zeits. Krist., 1926, vol. 64, pp. 1-70, 9 figs.

The following dimensions in Ångström units were found for the elementary cell containing four molecules:—anhydrite $a=6.20 \times b=6.94 \times c=6.97$, celestine $8.31 \times 5.34 \times 6.84$, baryte $8.85 \times 5.45 \times 7.14$, anglesite $8.46 \times 5.38 \times 6.95$, KMnO_4 $9.10 \times 5.69 \times 7.40$, KClO_4 $8.84 \times 5.65 \times 7.23$. The space-group is V_h^{16} , except for anhydrite, in which it is V_h^{17} . The double refraction of baryte is investigated by the Born-Ewald dynamical theory and compared with the experimental value. H. H.

PAULING (Linus) & EMMETT (Paul H.). *The crystal structure of barite*. Journ. Amer. Chem. Soc., 1925, vol. 47, pp. 1026-1030.

Baryte, examined by the X-ray spectrometer method, was found to crystallize on an arrangement with the symmetry of space-group V_h^{16} . There are four molecules of BaSO_4 in the unit cell, $a = 8.846$, $b = 5.430$, $c = 7.10$ Å., corresponding to $2a:b:c$ ($a:b:c$ being the previously accepted axial ratios). Parameters are not evaluated. [Cf. Abstr., vol. 2, p. 509.] H. E. B.

LEVI (G. R.) & NATTA (G.). *Sulla struttura cristallina della perovskite*. Atti (Rend.) R. Accad. Lincei, Roma, Cl. Sci. fis. mat. nat., 1925, ser. 6, vol. 2, pp. 39-46, 2 pls.

For the pseudo-cubic perovskite, CaTiO_3 , the authors find a unit pseudo-cubic lattice containing eight molecules with $a = 7.68 \text{ \AA}$. The arrangement is on a body-centred lattice and Laue-photograms show no apparent departure from cubic symmetry. Co-ordinates of atoms in a unit of one-half the above cell-length are: Ca, $(\frac{1}{2}\frac{1}{2}\frac{1}{2})$; Ti, (000); O, $(0\frac{1}{2}\frac{1}{2})$, $(\frac{1}{2}0\frac{1}{2})$, $(\frac{1}{2}\frac{1}{2}0)$.
H. E. B.

WYCKOFF (Ralph W. G.) & MOREY (George W.). *X-ray diffraction measurements upon compounds of the system soda-lime-silica*. Amer. Journ. Sci., 1926, ser. 5, vol. 12, pp. 419-440, 3 figs.

X-ray powder photographs show that the orthosilicate $\text{Na}_2\text{CaSiO}_4$ [Abstr., vol. 3, p. 167] is cubic with four molecules in the unit cell of edge $a = 7.497 \text{ \AA}$. The metasilicate $\text{Na}_4\text{Ca}(\text{SiO}_3)_3$, which is also crystallographically and optically cubic, is, however, pseudo-cubic according to the X-ray data, with $a = 7.547 \text{ \AA}$. and two molecules in the cell. The metasilicate $\text{Na}_2\text{Ca}_2(\text{SiO}_3)_3$, which shows weak birefringence with lamellar twinning like leucite, is also pseudo-cubic according to the X-ray data. These three compounds show very nearly the same X-ray patterns, and they present an anomalous case similar to that of mullite and fibrolite [Abstr., vol. 3, p. 187].
L. J. S.

ROSEBAUD (P.) [with H. MARK]. *Röntgenographische Untersuchungen an Aluminium-silikaten*. Zeits. Elektrochemie, 1926, vol. 32, pp. 317-319.

MARK (H.) & ROSEBAUD (P.). *Ueber die Struktur der Aluminiumsilikate vom Typus Al_2SiO_5 und des Pseudobrookits*. Neues Jahrb. Min., Abt. A, 1926, Beilage-Band 54, pp. 127-164, 1 pl., 2 text-figs.

The following values were obtained by the rotating crystal X-ray method:

		<i>a</i> .	<i>b</i> .	<i>c</i> .	Vol.	No. of mol.	Space-group.
Kyanite ...	...	7.18 $\text{\AA}$.	8.00 $\text{\AA}$.	5.55 $\text{\AA}$.	316 $\text{\AA}^3$	4	C_2^1
Andalusite ...	...	7.90	7.91	5.55	346	4	$V_{\frac{1}{2}}^{12}$
Fibrolite ...	...	7.25	7.65	5.88	330	4	$V_{\frac{1}{2}}^{12}$

From these values [which differ somewhat in the two papers] the axial ratios are calculated [but incorrectly]. Artificial fibrous mullite (sp. gr. 3.0) prepared by the Norton Company gave a diagram very similar to

that of fibrolite, but with $c = 2.94 \text{ \AA.}$ (half that of fibrolite). The space-group is V_h^9 , and the composition must be $2\text{Al}_2\text{SiO}_5$ or Al_2SiO_5 (not $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$, which would give an incomplete number of molecules in the cell). Pseudobrookite (ferric titanate), sp. gr. 4.60, from Aranyer Berg [Transylvania], has $a = 9.78$, $b = 9.80$, $c = 3.65 \text{ \AA.}$, with four molecules Fe_2TiO_5 , and space-group V_h^{12} ; it is isomorphous with andalusite. Atomic arrangements cannot be determined, but some are suggested.

L. J. S.

MENZER (G.). *Die Gitterkonstanten der Granate*. Centralblatt Min., Abt. A, 1926, pp. 343-344.

The purest garnets obtainable gave by the powder method (a second set of slightly different values is also given):

	a .	D(calc.).
Pyrope $(\text{Mg,Fe})_3\text{Al}_2\text{Si}_3\text{O}_{12}$	11.510 $\text{\AA.}$	3.733
Almandine, $\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12}$	11.497	4.354
Spessartine, $\text{Mn}_3\text{Al}_2\text{Si}_3\text{O}_{12}$	11.602	4.198
Grossular, $\text{Ca}_3\text{Al}_2\text{Si}_3\text{O}_{12}$	11.833	3.618
Uvarovite, $\text{Ca}_3\text{Cr}_2\text{Si}_3\text{O}_{12}$	11.951	3.858
Topazolite, $\text{Ca}_3\text{Fe}_2\text{Si}_3\text{O}_{12}$	12.024	3.875

L. J. S.

BURGESS (W. G.). *An X-ray examination of i-erythritol*. Phil. Mag., 1926, ser. 7, vol. 1, pp. 289-303, 7 figs.

This work is an attempt to ascertain the symmetry of a crystal-molecule which should contain two asymmetric carbon atoms. The arrangement of atoms is on space-group C_{4h}^6 , while the unit tetragonal cell has dimensions $a = 12.76$, $c = 6.83 \text{ \AA.}$, with eight molecules $\text{C}_4\text{H}_{10}\text{O}_4$. The a -axis is at 45° to that usually ascribed to this crystal. The crystal-molecule is centro-symmetrical, confirming the results of stereochemistry.

H. E. B.

TERPSTRA (P.). *Zur Kristallographie des Trimethylen-trinitramins*. Zeits. Krist., 1926, vol. 64, pp. 150-155, 1 fig.

Trimethylene-trinitramine ($\text{C}_3\text{H}_6\text{O}_6\text{N}_6$) crystals were obtained by very slow cooling of a warm solution in acetone. They are orthorhombic with $a:b:c = 0.8784:1:0.8149$. They are biaxial and negative, the c -axis being acute bisectrix, and (100) the plane of the optic axes. The etched figures point to holohedry. Rotation X-ray spectrograms gave the space-group V_h^1 with eight molecules in a unit cell of dimensions $a = 11.64$, $b = 13.25$, $c = 10.80 \text{ \AA.}$

H. H.

Meteorites: Cosmochemistry.

BRAUNS (R.). *Die Meteoritensammlung der Universität Bonn*. Verhandl. Naturhist. Vereins preuss. Rheinlande u. Westfalens, 1926, vol. 83, pp. 160-188.

Since the publication of the last catalogue of H. Laspeyres in 1894-5 the meteorite collection in the University of Bonn has increased from 271 specimens of total weight 110 kg. and representing 97 falls to 879 specimens of total weight $450\frac{1}{2}$ kg. and representing 353 falls. The catalogue is an alphabetical one under the three headings of meteoric irons, pallasites and mesosiderites, and meteoric stones. It is arranged under seven columns, giving respectively number, place of fall or find, date of fall or find, group, number of specimens, weight of largest specimen, and total weight. The symbols in the group column are, for the stones, those of Brezina, and, for the irons, those of Berwerth's classification. Noteworthy specimens are Bischtübe ($5\frac{1}{2}$ kg.), Cañon Diablo ($23\frac{1}{2}$ kg.), Mukerop (253 kg.), Roebourne (1.9 kg.), and Forsbach (the nearly complete stone of 200 gm.).

G. T. P.

PALACHE (Charles). *Catalogue of the collection of meteorites in the Mineralogical Museum of Harvard University*. Proc. Amer. Acad. Arts & Sci., 1926, vol. 61, no. 6, pp. 151-159.

The collection begun by J. P. Cooke became important by the acquisition of the J. Lawrence Smith collection in 1883. It contains representatives of 351 falls with a total weight of 1657 kg. Large specimens of principal masses are those of Avoca, Bethany [= Mukerop] (232.3 kg.), Britstown, Cumpas, Gun Creek, Mount Ouray, New Baltimore, Ollague, Sierra Sandon, Ticeraco Creek. The catalogue is an alphabetical one with six columns giving the catalogue number, date of fall or find, class (Brezina's classification), locality, weight in grams of largest mass, and total weight.

G. T. P.

PALACHE (C.). *Notes on new or incompletely described meteorites in the Mineralogical Museum of Harvard University*. Amer. Journ. Sci., 1926, ser. 5, vol. 12, pp. 136-150, 6 figs.

Descriptions are given of a pallasite of $6\frac{2}{3}$ kg. found in 1923 near Ollague, Potosi, Bolivia; a coarse octahedrite of $6\frac{1}{3}$ kg. found in 1923 in the Sierra Sandon, Taltal, Chile; a finest octahedrite of 544 gm. found before 1910 at Britstown, Cape Province, South Africa; a medium octahedrite of 63 lb. found in 1903 at 25 miles east of Cumpas, Sonora,

Mexico, containing, according to an analysis by E. V. Shannon, Ni 6 % ; a medium octahedrite of 2 lb. found in 1898 on Mount Ouray, Chaffee Co., Colorado, containing about 8 % of nickel ; a medium octahedrite of 50 lb. found in 1909 at Gun Creek, Gila Co., Arizona, containing Ni $6\frac{1}{2}$ % ; a coarse octahedrite of 10 lb. found before 1862 at Ehrenberg, Yuma Co., Arizona, previously known as 'Colorado River' ; and of the masses of pallasite weighing together about 1.6 kg. found in the Turner Mounds, Anderson, Ohio, in 1882.

G. T. P.

LACROIX (A.). *Les veinules fondues des météorites, leur analogie avec les "pseudotachylites" des régions terrestres écrasées.* Compt. Rend. Acad. Sci. Paris, 1926, vol. 182, pp. 1581-1584.

The black veins such as are observed in the eucrites of Béréba [Abstr., vol. 3, p. 93] and Cachari and other meteoric stones are very similar to the 'pseudo-tachylyte' veins in the crushed granites and gneisses of Vredefort, Orange Free State [Abstr., vol. 3, p. 87], and the Barra islands, Hebrides. The meteorite veins are therefore possibly of extra-terrestrial origin.

G. T. P.

LACROIX (A.). *Note préliminaire sur un aérolithe découvert dans le département de la Côte-d'Or et, à ce propos, remarques sur la classification et la nomenclature des chondrites.* Compt. Rend. Acad. Sci. Paris, 1926, vol. 182, pp. 1498-1501.

A much oxidized mass of about 14 kg. was found at Villedieu near Molesme. It possibly fell in May about 30 years previously when a fire-ball was seen and detonations heard. A classification is suggested of chondrites into pyroxenic, pyroxeno-peridotitic, and peridotitic (unknown at present) ; according to the amount of iron, the second class can be divided into megasideriferous (corresponding to bronzite-chondrites), and oligosideriferous and cryptosideriferous (corresponding to hypersthene-chondrites). The Villedieu meteorite is a pyroxeno-peridotitic megasideriferous chondrite.

G. T. P.

LACROIX (A.). *La météorite de Roda.* Compt. Rend. Acad. Sci. Paris, 1925, vol. 180, pp. 89-93.

According to an analysis by — Raoult, the Roda (Spain ; fell 1871) meteorite contains 10.09 % feldspar (near to bytownite), 64.73 hypersthene ($\text{MgO} : \text{FeO} = 3$), 22.38 olivine ($\text{MgO} : \text{FeO} = 3.3$) : it is considered to be a distinct type of achondrite for which the name rodite can be kept.

G. T. P.

RISCO (M.). *Analyse spectrale de la météorite du 19 juin 1924.* Compt. Rend. Acad. Sci. Paris, 1924, vol. 179, pp. 771-772.

In the Olivenza (Spain) meteoric stone traces of Sr, V, Ti, and doubtfully Ba were found, in addition to the usual constituents [but Na not noted]. G. T. P.

HESS (—). *Der Meteorit von Unter-Massing.* Jahresber. Naturhist. Gesell. Nürnberg, for 1920, pp. 13-16, 1 pl.

A mass of about 8 kg. of meteoric iron was found in May 1920, at a depth of 1.5 metres about 2 miles east of Unter-Massing in Bavaria. The iron is a finest-octahedrite, containing 9.93 % Ni. Its specific gravity is 7.89. G. T. P.

DRAHNÝ (František). *Nový nález meteorického železa u Opavy.* [New find of meteoric iron near Opava.] (Preliminary report.) Věda Přírodní, 1926, vol. 7, pp. 139-144, 1 pl., 3 text-figs.

Several pieces of meteoric iron were found on July 3, 1925, at a depth of about 80 cm. in loess on the Kylešovský hill at Opava, the capital of Czech Silesia. They are irregular in shape, and the weights of the pieces that have been kept and preserved in the county museum are 7.39, 5.79, 1.15, and 0.11 kg. (total 14.44 kg.). A flint implement was found near by, and it is presumed that the iron had been transported by palaeolithic man. F. S.

[PILIPENKO (P. P.)] Пилипенко (П. П.). О Летьжевском метеорите падения 1917 года. [On the Letyazhevka meteorite fallen in 1917.] Учен. Зап. Госуд. Саратов. Унив. [Mem. State Univ. Saratov], 1924, vol. 1, pt. 3, separate 3 pp.

Notes relating to an uncertain fall in December 1917 (1919 ?) near the railway station Letyazhevka, district Balashov, gov't. Saratov. The author visited the place in 1922 but failed to find the meteorite. The inhabitants heard no sounds at the time [and probably only a bolide was observed], though the author believes that a meteorite fell. P. N. C.

[PILIPENKO (P. P.)] Пилипенко (П. П.). К вопросу о радиоактивности Саратовского метеорита падения 1918 г. [On the question of the radioactivity of the Saratov 1918 meteorite.] Ученые Записки Государственного Саратовского Университета [Mem. State Univ. Saratov], 1924, vol. 1, pt. 3, separate 4 pp.

Radioactivity was tested with an Altmann electroscope for the chondrites of Saratov (Donguz and Belaya Gora), Kashin, and Pultusk. In all cases it is very slight ; for the first two 0.01 (Mache's scale), and for

the two others less than 0.01. The Saratov stones are being tested for other heavy elements.

P. N. C.

[KULIK (L. A.)] Кулик (Л. А.). Кашинский метеоритъ 27(14) февраля 1918 г. (Предварительный отчетъ). [Title on wrapper:] KULIK (L. A.). *La météorite de Kašin, tombé le 27(14) février 1918. (Rapport préliminaire.)* Изв. Росс. Акад. Наукъ (Bull. Acad. Sci. Russie), 1918, ser. 6, vol. 12, pp. 1089–1108, 3 figs.

Other shorter accounts appeared in 'Mirovédénié', 1918, vol. 7, pp. 140–142, and in 'Priroda', 1919, pp. 272–274. [See 'Glasatova', near Kashin, Abstr., vol. 2, p. 258.]

P. N. C.

[KULIK (L. A.)] Кулик (Л. А.). Отчет Метеоритной Экспедиции о работах, произведенных с 19 мая 1921 г. по 29 ноября 1922 г. [*Report of the Meteorite Expedition from 19 May 1921 to 29 November 1922.*] Изв. Росс. Акад. Наук (Bull. Acad. Sci. Russie), 1922, ser. 6, vol. 16, pp. 391–410, 1 pl., 8 text-figs.

Gives the results of the meteorite expedition sent out by the Museum of the Academy of Sciences. Localities are indicated by sketch-maps. The more important meteorites obtained are: *Dorofeevka*, Kokchetav district, Omsk, Siberia; a hexahedrite weighing 12679 gm., found in 1910. *Kagarlyk*, Kiev govt.; an almost entire stone weighing 1912 gm., fell in June 1908. *Demina*, Biysk district, Altai; two fragments (793 and 31 gm.) with crust, fell September 1911. *Saratov* (at Donguz and Belaya Gora [= White Mtn.], Saratov govt.), a spherical chondrite which fell in September 1918; 222 fragments with a total weight of 51880 gm. were collected, and the Museum now possesses over 77000 gm. of this fall. [Abstr., vol. 2, p. 258.]

P. N. C.

[KULIK (L. A.)] Кулик (Л. А.). Четвертый Брагинский метеорит.— KULIK (L.). *Sur le quatrième météorite de Bragin.* Докл. Росс. Акад. Наук (Compt. Rend. Acad. Sci. Russie), 1924, pp. 85–88.

KULIK (L.). *Meteoriten von Brahın und Meteoritenschauern.* Миропведение (Mirovédénié, Bull. Soc. Russ. des Amis de l'Étude de l'Univers), 1924, vol. 13, pp. 231–233.

A pallasite mass weighing 66 kg. was found in 1924 at a depth of about one metre at Kutzovka, about 2 km. east of Koporenki village, Rechitza district, Gomel (= Homel, formerly Minsk) govt. It represents the same fall as the Brahın masses of 79 and 17 kg. found in 1810, and the mass of 182 kg. found in 1911 [Abstr., vol. 2, p. 258] to the east of Kruki village and 14 km. west of the locality of the new find. It is

suggested that the different finds be distinguished by the double names Brahın-Kutzovka and Brahın-Kruki. The newly found mass is now in the museum of the Academy of Sciences in Leningrad, and the three others in Kiev. The first paper gives a bibliography of 20 items on the Brahın meteorite. P. N. C.

[KULIK (L. A.)] КУЛИК (Л. А.). К вопросу о связи метеоритов с кометами. [Summary:] KOULIK (L. A.). *On the connexion of meteorites with comets.* Мироведение (Mirovédénie, Bull. Soc. Russ. des Amis de l'Étude de l'Univers), 1926, vol. 15, pp. 173-176 (Russ.), pp. 177-178, (Engl.), 1 fig.

— Метеориты 30 июня 1908 года и пересечение землей орбиты кометы Понс-Виннеке.—KOULIK (L.). *Les météorites du 30 juin 1908 et l'orbite de la comète Pons-Winneke.* Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), ser. A, 1926, pp. 185-188, 1 fig.

After appearance of a very luminous fire-ball followed by detonations a meteoric stone of about 2 kg. was seen to fall at Kagarlyk, 60 km. from Kiev, on June 30, 1908 [Abstr. vol. 2, p. 258]; and on the same date a large meteorite is believed to have fallen near the Khatanga river in Siberia [Abstr., vol. 3, p. 92]. At the end of June and beginning of July in that year 'lighting clouds' were observed in Europe and Siberia between 42° and 60° latitude. On June 30, 1908, the earth was at its nearest distance from the orbit of the comet Pons-Winnecke. All these phenomena are supposed to be genetically connected. G. T. P.

HOVEY (Edmund Otis) [1862-1924], with supplemental notes by MERRILL (George P.) and SHANNON (Earl V.). *A new meteoric stone from Johnstown, Weld County, Colorado.* Amer. Mus. Novitates, 1925, no. 203, 13 pp., 6 figs.

On July 6, 1924, at 4.20 p.m., after four explosions, 27 stones were found over an area of 10 (SSW. to NNE.) × 2 miles near Johnstown. The four largest stones were seen to fall after leaving a trail of 'light grey smoke'. The total weight recovered was about 40½ kg. and the largest fragment weighed about 23½ kg. The stone is an achondrite similar to Shalka, except that the pyroxene is a clinoenstatite or clino-bronzite. Analyses of the metallic and silicate portions of the stone were made by J. E. Whitfield, and separate analyses of the pyroxene, feldspar (on 0.11 gm.), and metal (0.10 gm.) by E. V. Shannon. The ratio of MgO to FeO in the pyroxene is about 4. The iron, amounting to 0.33 %, contains only 2.8 % of nickel. G. T. P.

TIPPER (G. H.). *The Merua meteorite*. Rec. Geol. Survey India, 1925, vol. 56, pp. 345-351, 10 pls., 1 text-fig.

After detonations six stones, of total weight 71.4 kg., fell about 10 miles east of the city of Allahabad, India, the largest of 56.7 kg. at Merua, two at Manpur Urf Baghai Kalan, and one each at Chukri, Umri, and Mustafabad. A striking feature of the stones are deep depressions and slickensided surfaces. An analysis by F. R. Ennos shows that the meteorite is a chondrite of the Cronstad type with nickel-iron (ratio of Fe to Ni = 10) 20.10, troilite 5.68, olivine ($\text{MgO} : \text{FeO} = 6.7$) 29.36, bronzite ($\text{MgO} : \text{FeO} = 5.3$) 32.78 %.

G. T. P.

LACROIX (A.). *Les météorites de Tuan Tuc (30 juin 1921) et de Phû Hong (22 septembre 1887) en Cochinchine*. Compt. Rend. Acad. Sci. Paris, 1925, vol. 180, pp. 1977-1980.

Analyses by — Raoult show that Tuan Tuc (sp. gr. 3.376) [Abstr. vol. 2, p. 258] is a hypersthene-chondrite and Phû Hong (sp. gr. 3.659) a bronzite-chondrite with respectively $(\text{Fe}, \text{Co}) : \text{Ni} = 7.7$ and 13.5; $\text{MgO} : \text{FeO}$ of pyroxene = 3.2 and 3.3; $\text{MgO} : \text{FeO}$ of olivine = 3.1 and 4.3.

G. T. P.

GISOLF (W. F.). *De meteoriet van Tjerebon*. Jaarb. Mijnwezen in Nederlandsch-Indië, Verhand., 1925, vol. 53 (for 1924), pp. 168-180, 4 pls.

An account is given of the fall of a meteorite at 10.30 p.m. on July 10, 1922, at Tjerebon on the north coast of Java. Two fragments weighing 8.481 and 7.982 kg. were found. It is a chondritic stone with sp. gr. 3.29. Analysis by Braake gave Fe 14.21, Ni 1.49, S 1.99, FeO 19.24, Al_2O_3 2.30, MnO 0.47, CaO 0.80, MgO 21.45, Na_2O 0.75, K_2O 0.43, NiO 0.13, SiO_2 35.57, chromite 0.61 = 99.44, corresponding with nickel-iron 12.21, troilite 5.48, chromite 0.61, olivine ($\text{Fe}_2\text{SiO}_4 \cdot 2\text{Mg}_2\text{SiO}_4$) 58.37, bronzite ($3\text{FeSiO}_3 \cdot 8\text{MgSiO}_3$) 12.44, feldspar ($\text{Or}_6\text{Ab}_{12}\text{An}_3$) 10.89 %.

L. J. S.

HOSHINA (Masaaki). *The meteorite "Ôtomigô"* Japanese Journ. Geol. Geogr. [1926], vol. 4 (for 1925). Abstracts p. (1) [from Journ. Geol. Soc. Tokyo, 1925, vol. 32, pp. 177-179. Japanese].

The Ôtomigô meteorite fell at Ôtomi village in Yamagata prefecture on May 24, 1867. It weighs 6.51 kg. and measures $18.2 \times 15.5 \times 12$ cm.; sp. gr. 3.919. A recent analysis gave Fe 26.37, Ni 0.11, Co 0.001, Cu 0.03, Cr 0.26, S 1.26, P 0.18, C 0.18, SiO_2 38.48, Al_2O_3 2.15, CaO 2.00, MgO 28.61, total '92.431'.

L. J. S.

HSIEH (C. Y.). *Preliminary notes on the composition and structure of the first specimen of meteoric stone received by the Geological Survey of China.* Bull. Geol. Soc. China, 1923, vol. 2, no. 3-4, pp. 95-97, 1 pl.

At about noon on July 11, 1917, after detonations and the appearance of a white light, a stone of about 117 lb. fell at Nan Yang Pao in south-eastern Kansu and was found in the loess ground at a depth of one foot. The stone appears to be a spherical chondrite. G. T. P.

LEE (H. T.). *A stone meteorite from northern Kiangsu.* Bull. Geol. Soc. China, 1925, vol. 4, pp. 273-276, 1 pl.

On October 5, 1924, at 6.22 p.m., after the appearance of a large fire-ball passing from SW. to NE. and detonations, several stones fell near the town of Feng-Hsien. A conical grey chondritic stone, weighing 82 gm., is described. G. T. P.

SMITH (T. Hodge) & WHITE (H. P.). *The "Ticraco Creek" siderite.* Rec. Australian Museum, 1926, vol. 15, pp. 66-68, 3 pls., 1 text-fig.

A mass of meteoric iron weighing 4173.5 gm., sp. gr. 7.59, was found before 1922 near the head of Ticraco Creek, North Murchison goldfield, Western Australia. It shows 'thumb-marks' and 'drill-holes'; one of the latter penetrates the mass, and the suggestion is made that these are due to the weathering of troilite nodules since the mass fell. Widmanstätten structure is brought out on the weathered surface. A polished and etched section shows the Widmanstätten figures of different sizes in two portions; the structure is that of a fine octahedrite. Analysis gave Fe 89.056, Ni 9.66, Co 0.72, Cu trace, Cr trace, Pt 0.001, P 0.203, S 0.143, C 0.008, Cl nil, Si nil = 99.791. Schreibersite crystals, sp. gr. 7.01, isolated by dissolving the iron in dilute acid, show the forms $b(010)$, $m(110)$, $d(101)$, and new $s(177)$ [$c = 0.4880$].

L. J. S.

NÁGERA (Juan José). *Los hoyos del Campo del Cielo y el meteorito.* Dirección General de Minas, Geología e Hidrología, Argentina, Buenos Aires, 1926, publ. no. 19, 9 pp., 19 pls.

In the Campo del Cielo, in the Gran Chaco, is a group of small depressions ('hoyos'). It is concluded that these are of human origin, and that they were not formed by the fall of a meteorite. In the Rubín de Celis depression (56 metres in diameter and 5 metres deep) small fragments of rusted metallic iron were found, but only in one pit dug in disturbed ground. Analyses of the iron show Ni 5.63 %. It is concluded

that this meteoric iron [Otumpa] had been transported by the people, probably aborigines, by whom the hollows were made. L. J. S.

YOUNG (J.). *The crystal structure of meteoric iron as determined by X-ray analysis.* Proc. Roy. Soc. London, Ser. A, 1926, vol. 112, pp. 630-641, 1 pl., 2 text-figs.

X-ray spectrometer measurements made on sections parallel and perpendicular to the Widmanstätten (octahedral) planes of the Carlton and Cañon Diablo irons show that kamacite is body-centred cubic with $a = 2.870$, and that taenite is face-centred cubic with $a = 3.590 \text{ \AA}$. A (110) plane of kamacite is parallel to a (111) plane of taenite; and the same kind of intergrowth occurs in the finer grained 'plessite'. The further orientation and the origin of the Widmanstätten structure are discussed. L. J. S.

BORGSTRÖM (L. H.). *On the composition of the meteoric nickel iron alloys and on magnetic lines on sections of meteoric irons.* Fennia (Bull. Soc. Géogr. Finlande), Helsinki, 1925, vol. 45, no. 2, 18 pp., 1 fig.

Analyses were made of a sample of kamacite sawn out in the form of small lamellae from a thin etched plate of the Thunda meteorite, of small fields of plessite from etched plates of the Rodeo iron, and of plessite from the Marjalahti pallasite. The percentages of Ni + Co were 7.47, 12.82, and 13.81 respectively. The Ni + Co in taenite is taken as 38 %, the highest on record. Measurements were made on etched slices of twenty-six octahedrites in the meteorite collection of Helsingfors University in order to determine the relative amounts of kamacite, taenite, and plessite. The nickel contents of the irons were then calculated from the nickel percentages of about 7, 38, and 14 respectively of these three components and found to agree within 1 % of the amounts given in published analyses. Taenite is much richer in carbon than kamacite, the latter containing less than 0.1 %. In a large number of meteoric irons the taenite is permanently magnetic and causes magnetic lines on a polished slice if the surface is strewn with iron powder. G. T. P.

GOLDSCHMIDT (V.). *Über Aussprünge und Schläge bei Wüstenstein, Meteoriten und Werkzeugen.* Beitr. Kryst. Min., 1924, vol. 2, pp. 156-163, 2 pls., 8 text-figs.

The forms of fracture produced by the splitting off of scales from the surface of stones in deserts and of meteorites, due to sudden changes in temperature, are compared with those produced by impact in the manufacture of flint implements. L. J. S.

TSCHIRWINSKY (Peter) [= CHIRVINSKY (P. N.)]. *Gibt es einen Zusammenhang zwischen Steinschauer und periodischen Sternschnuppen?* Centralblatt Min., Abt. A, 1926, pp. 332-336.

Comparison of their radiants indicates that no connexion appears to exist between showers of meteoric stones and the great periodic displays of shooting stars. G. T. P.

TSCHIRWINSKY (Peter) [= CHIRVINSKY (P. N.)]. *Monatstatistik der Meteoritenfälle.* Centralblatt Min., Abt. A, 1926, pp. 239-240, 1 fig.

Brings up to the year 1920 O. C. Farrington's curve of the monthly falls of meteorites. In both the May-June maximum is evident, but in the more recent curve the striking July minimum disappears.

G. T. P.

TSCHIRWINSKY (Peter) [= CHIRVINSKY (P. N.)]. *Beitrag zur Deutung der mittleren chemischen und mineralogischen Zusammensetzung der Steinmeteorite. Das Pseudoelement Chondrium.* Centralblatt Min., Abt. A, 1926, pp. 246-256.

The 'collective element' chondrium [Abstr., vol. 2, pp. 85, 157], representing the mean chemical composition of meteoric stones as deduced by O. C. Farrington, has the atomic weight of 24.36, the same as that of magnesium. The alkalis in meteoric stones are considered to be mainly constituents of the ferromagnesian silicates rather than of felspar. The average ratio of MgO : FeO in both olivine and pyroxene of meteoric stones is given as 5 : 2.

G. T. P.

HARKINS (William D.) & STONE (S. B.). *The isotopic composition of the element chlorine in the meteorites: the atomic weight of meteoric and terrestrial chlorine.* Proc. Nat. Acad. Sci. U.S.A., 1925, vol. 11, pp. 643-645.

——— *The isotopic composition and atomic weight of chlorine from meteorites and from minerals of non-marine origin.* Journ. Amer. Chem. Soc., 1926, vol. 48, pp. 938-949.

The atomic weight of chlorine extracted from a meteorite [kind of material not stated] was determined as 35.4580, and of chlorine from terrestrial sources (apatite, sodalite, scapolite, and common salt) as 35.4575, this difference being within the limits of error. L. J. S.

WASHINGTON (Henry S.). *The radial distribution of certain elements in the earth.* Journ. Washington Acad. Sci., 1924, vol. 14, pp. 435-442. [Cf. Abstr., vol. 1, p. 160; vol. 2, pp. 344-345, 389, 558.]

From the nickel-iron core to the upper part of the earth's crust there is a gradual increase in silicon from 0 to 27.7 %, and in oxygen from 0 to 46.0 %. Further, the orthosilicates of the 'lithosporic' shell pass outwards into metasilicates and polysilicates with finally free silica. Calcium first appears in the upper part of the 'ferrosporic' shell and reaches a maximum in the basaltic layer, being then replaced by increasing amounts of sodium and finally by potassium. L. J. S.

GOLDSCHMIDT (V. M.). *Geochemische Verteilungsgesetze der Elemente.*

II. *Beziehungen zwischen den geochemischen Verteilungsgesetzen und dem Bau der Atome.* Vidensk. Skrifter, I. Mat.-nat. Kl., Kristiania, 1924, no. 4, 37 pp., 1 pl.

— & THOMASSEN (L.). — III. *Röntgenspektrographische Untersuchungen über die Verteilung der seltenen Erdmetalle in Mineralien.* Ibid., 1924, no. 5, 58 pp., 1 fig. [Cf. Abstr., vol. 3, p. 181.]

II. A theoretical discussion. On the curve given by plotting the atomic numbers against the atomic volumes of the elements, the 'siderophil' elements [Abstr., vol. 2, p. 159] fall at the minima; and, with some few exceptions, the 'chalcophil' elements on the ascending branches and the 'lithophil' elements on the descending branches.

III. Several rare-earth minerals were examined for rare-earths by the method of X-ray spectrum-analysis [Abstr., vol. 2, p. 50], and the results are tabulated. Different types in the association of the elements are distinguished. An appendix by V. M. GOLDSCHMIDT, *Über die Umwandlung krystallisierter Minerale in den metamikten Zustand (Isotropisierung)* (pp. 51-58) gives a review of 'metamict' minerals. It is suggested that such minerals as fergusonite (YNbO_4) and thorite (ThSiO_4), being combinations of weak bases and acids, may readily fall to solid solutions $\text{Y}_2\text{O}_3 + \text{Nb}_2\text{O}_5$ and $\text{ThO}_2 + \text{SiO}_2$. Variable amounts of water are taken up by these optically isotropic glasses. The glow on heating is due to the heat of recombination of the oxides and the heat of crystallization.

L. J. S.

Miscellaneous.

SZEBELLÉDY (László). *Calcium, strontium, baryum.* Budapest, 1926, 70 pp.

This dissertation is mainly chemical (pp. 1-50). New and delicate methods are given for the analytical separation of Ca, Sr, and Ba. New

analyses are given of: I, strontianite from Argyllshire; II, witherite from Anglezarke, Lancashire; III, celestine from Girgenti.

	CaO.	SrO.	BaO.	FeO.	CO ₂ .	SO ₃ .	SiO ₂ .	Total.
I	4.05	65.01	—	trace	30.84	—	0.06	99.96
II.	0.05	—	77.62	trace	22.80	0.10	—	100.07
III.	0.53	55.54	trace	trace	—	43.53	—	99.60

K. Z.

ZSIVNY (Viktor). *A fluorit magyarországi új előfordulásáról.* [Translation:] *Über ein neues Fluoritvorkommen in Ungarn.* Ann. Hist.-Nat. Musei Nationalis Hungarici, 1926, vol. 24, p. 426 (Hung.), pp. 426-427 (Germ.).

A small specimen from Dobsina, com. Gömör, shows banded greyish and pale-rose fluorite on which are two (6 mm.) octahedra with crystals of pyrite and chalcopyrite.

K. Z.

ZIMÁNYI (Karl). *Über ein Vorherrschen der Form ϵ {10.3.0} am Eisenkies.* Centralblatt Min., Abt. A, 1926, pp. 15-17, 1 fig.

Crystals (1-4 mm. across) of pyrite on ankerite with chalybite and haematite from Csetnek, com. Gömör, [Slovakia], show $d(110)$ and $\epsilon(10.3.0)$ as predominating forms, other forms present being *a o e p s t* [Dana's letters].

L. J. S.

ZSIVNY (Viktor). *Ankerit Csetnekről.* [Translation:] *Ankerit von Csetnek (Comitat Gömör).* Ann. Hist.-Nat. Musei Nationalis Hungarici, 1926, vol. 24, pp. 422-423 (Hung.), pp. 423-425 (Germ.).

The ankerite analysed occurs in drusy cavities in a coarse spathose chalybite. The greyish-white crystals $r(10\bar{1}1)$ are built up of sub-individuals with curved faces and show a slight pearly lustre. Sp. gr. 3.08 at 20° C. Analysis gave CaO 28.95, MgO 7.68, FeO 17.88, MnO 2.02, CO₂ 43.98, insol. 0.04 = 100.55, agreeing with the formula $30\text{CaCO}_3 \cdot 11\text{MgCO}_3 \cdot 16(\text{Fe}, \text{Mn})\text{CO}_3$.

K. Z.

[FERSMAN (A. E.) & VLODAVETZ (N. I.)] FERSMANN (A.) und WLODAWETZ (N.). *Über freie Schwefelsäure als Mineralspecies.* Ферсман (А. Е.) и Влодавец (Н. И.). О свободной серной кислоте, как минеральном виде. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), ser. A, 1926, pp. 149-152 [German].

A snow-white sandstone covering the sulphur deposit of the Darvasa hill, Karakum desert, Trans-Caspia, has a distinct acid reaction and a very acid taste. Analysis gave SiO₂ 88.45, TiO₂ 0.44, Al₂O₃ 0.20, Fe₂O₃ 0.02, FeO 0.11, CaO 0.28, MgO 0.16, Na₂O trace, K₂O 0.36,

H₂O 5.29, SO₃ 4.50, Cl 0.05, total (less O for Cl) 99.85. This sample must therefore contain 4.6 % free H₂SO₄. Other similar siliceous rocks from the upper part of the same hill gave 2.64, 0.09, 4.27, 1.09, 0.30, 4.58 % free H₂SO₄. The acid is probably present as a complex absorption system with opal hydrogels, and it has evidently been formed by the oxidation of sulphur in the hot desert (75° C. on the surface and 30–40° at a depth of $\frac{1}{2}$ metre). This occurrence is compared with the 'sulfuricin' of H. T. Guyard, 1874, and with the Sicilian melanophlogite [cf. also sulphatite in Dana's 5th edition, 1868.] P. N. C.

[NENADKEVICH (K. A.)] Ненадкевич (К. А.). О химическом составе уранинитов Карелии и отношении в них свинца к урану. [Title on wrapper:] NENADKEVIČ (K.). *Sur la composition chimique des uraninites de la Carelie et la relation entre le plomb et l'uranium*. Изв. Акад. Наук СССР (Bull. Acad. Sci. URSS), 1926, ser. 6, vol. 20, pp. 767–774.

Analyses have been made of uraninite from several places in the neighbourhood of the railway-station Polyarnyi Krug [Polar Circle] in Karelia [Abstr., vol. 3, pp. 107, 146]. Details are given of the methods of analysis. The mean result for uraninite from Sinyaya pala is: UO₃ 36.94, UO₂ 34.49, PbO 19.50, rare-earth oxides 5.60, ThO₂ 0.15, SiO₂ and insoluble 0.53, H₂O 1.40, CaO 0.72, Cl 0.23, Al and Fe traces, total 99.56. The lead from these uraninites has atomic weight 206.06 (mean of 206.02 and 206.11) indicating uranium-lead. Partial results of other analyses are given in the following abstract. P. N. C.

[FERSMAN (A. E.)] Ферсман (А. Е.). О возрасте урановых минералов в пегматитовых жилах. [Title on wrapper:] FERSMANN (A.). *Sur l'âge de l'uraninite dans les filons de pegmatite*. Изв. Акад. Наук СССР (Bull. Acad. Sci. URSS), 1926, ser. 6, vol. 20, pp. 775–780.

Analyses by K. A. Nenadkevich (preceding abstract) and B. G. Karpov [Abstr., vol. 3, p. 146] of uraninites from Karelia have given the following data:

Locality.	UO ₃ .	UO ₂ .	PbO.	Pb/U.	Age in millions of years.
Sinyaya pala	...	80.63	12.9	0.17	1122
Shar lake ...	54.59	27.00	16.29	0.231	1524
Sinyaya pala	36.94	34.49	19.50	0.296	1950
Panfilova varaka	59.89	6.15	18.83	0.316	2085
Ditto (gummite)	63.86	nil	18.93	0.332	>2000

The ages deduced vary widely, and the same is the case for uraninites from Norway and Canada. A critical review is given of the possible

causes for these variations, and the author believes, with K. A. Nenadkevich, that the amount of UO_3 and the condition of the mineral may be of some consequence; for example, the uraninite from Panfilova varaka is weathered and rich in UO_3 . P. N. C.

[NENADKEVICH (K. A.)] Ненадкевич (К. А.). Заметка о нахождении теллуристых соединений серебра, золота и висмута в Забайкалье.— NENADKEVIČ (K.) = NENADKIEWIETCH (K.). *Sur les tellurides d'argent, d'or et de bysmuthe, trouvés en Transbaicalie*. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), ser. A, 1926, pp. 139–141.

Small (rarely over 2 cm.) pebbles of tellurides were found by I. S. Belousov in the gold-washings of the Khorogoch river in Transbaikalia. They are accompanied by granite pebbles, granite minerals, and pyrite. Analysis I is of a silver-grey pebble, II of a pebble with golden tarnish, indicating hessite and petzite respectively (anal. I and II by I. S. Belousov). A grey-black pebble of hessite gave III (also Bi and insoluble in HNO_3 0.30).

	Te.	Ag.	Au.	Fe_2O_3 .	CaO.	MgO.	S,Se.	Total.	Sp. gr.
I.	35.80	62.80	—	0.80	0.34	0.10	nil	99.84	8.00
II.	34.90	45.32	19.00	0.63	—	—	nil	99.85	8.735
III.	36.32	63.29	—	—	—	—	—	99.91	—

P. N. C.

[SAUKOV (A. A.)] Сауков (А. А.). Исследование марганцового минерала с Кара-Чагыра из Ферганской области.—SAUKOV (A.) (SAOUKOFF (A.)). *Note sur un minéral manganifère de Kara-Tchaguir en Fergana*. Докл. Акад. Наук СССР (Compt. Rend. Acad. Sci. URSS), ser. A, 1926, pp. 77–79.

A soft pitch-black mineral encrusts the walls of crevices in the black quartz-schist of the kolovratite deposit at Kara-Chagyr in Fergana. It forms slaggy masses, or concentrically surrounds greenish-blue earthy allophane, or in places cements the silicified breccia. It is porous and floats on water; sp. gr. 2.985. Analysis gave MnO_2 23.6, Fe_2O_3 2.7, Al_2O_3 9.8, ZnO 10.4, NiO 11.8, CoO 1.4, CuO 5.41, CaO 0.8, V_2O_5 4.3, Mo not det., H_2O (at 110°) 4.6, H_2O (over 110°) 19.9, insol. 2.95, total 97.66. The mineral is thus related to asbolane and rabdionite, and is compared with the radioactive manganiferous nodules from Tanokami, Japan (S. Iimori, Sci. Papers App. Inst. Phys. Chem. Tokyo, 1926, vol. 4, p. 79). P. N. C.

ŽEMCZUŽNY (S. F.) [= ZHEMCHUZHNYI (S. F.)]. *Untersuchung der Struktur des gediegenen Platins*. Zeits. Anorg. Chem., 1926, vol. 156, pp. 99–142, 3 pls.

Translation from the Russian published in 1920 [Abstr., vol. 2, p. 441].

GIUȘCĂ (Dan). *Cristallographie.—Formes nouvelles de la célestine*. Bull. Sect. Sci. Acad. Roumaine, 1924, vol. 9, pp. 25–28, 3 figs.

Small colourless crystals of celestine, with sulphur in limestone from Caltanissetta, Sicily, show the forms (001), (011), (102), (104), (110), and gave $a : b : c = 0.7813 : 1 : 1.2823$. The faces (102), (104), and (110) are often partly or completely replaced by the vicinal faces (50.0.101), (10.0.41), (25.0.101), (10.0.39), (133.133.5), and (159.159.10). Of these, (50.0.101) was recorded by S. Kreutz in 1915. L. J. S.

CAROBBI (G.). *Ricerche chimiche e spettrografiche sulla piromorfite di Leadhills, Lanarkshire (Scozia) e sulla mimetosite di Santa Eulalia, Chihuahua (Messico)*. Rend. Accad. Sci. Fis. Mat. Napoli, 1926, ser. 3, vol. 32, pp. 54–69.

By the ordinary analytical methods 28 grams of pyromorphite from Leadhills gave: Rare-earth oxides 0.02, Cr_2O_3 0.1, MnO 0.001, CaO 0.16 %, SrO , BaO traces. Spectroscopic analysis of the rare-earths showed the presence of Ce, La, Nd, Y, Eu, Gd, Dy, Er, and probably Yb and Ho; also, as impurities, V, Mn, Ba, Sr, Ca, Cr. Mimetite from Mexico gave: Cr_2O_3 0.07, MnO 0.008, ZnO 1.37, CaO 0.29, $\text{BaO} + \text{SrO}$ 0.009 %, and spectroscopic analysis showed the absence of rare-earths. L. J. S.

SCHOEP (Alfred). *Sur la présence de la shattuckite et de la planchéite sous forme compacte à Tantara. Association cuprite-shattuckite-planchéite*. Ann. Soc. Géol. Belg. Publ. Congo Belge, 1926, vol. 48 (for 1924–25), pp. c 21–c 24, 1 fig.

Crystals and grains of cuprite occur embedded in deep-blue, almost black, shattuckite from Tantara, Katanga. The compact shattuckite (H. 6–7) has a fibrous spherulitic structure with intense pleochroism—dark-blue along the fibre and pale-blue across the fibre. The elongation is positive, but the extinction is not quite straight; refr. indices about 1.8 and 1.75. Associated with this is pale-blue compact plancheite, which is softer (H. scarcely 5) and with lower refractive indices [Abstr., vol. 3, p. 59], and also some chrysocolia and cornuite. Analyses of the plancheite (containing some admixed cornuite and cuprite) gave:

	SiO_2 .	CuO .	Fe_2O_3 .	CaO .	H_2O .	CO_2 .	Sp. gr.
I.	38.33	47.85	2.99	1.43	8.08	0.57	—
II.	39.11	49.34	1.68	0.58	—	—	3.37

Dehydration curves are given for plancheite and for cornuite. Pseudomorphs of shattuckite after cuprite are mentioned, and it is suggested that plancheite represents a further stage in the alteration. L. J. S.

HACQUAERT (Armand L.). *Rooskleurig kalkspaat van Tantara (Katanga)*. [Flemish with French résumé (p. 102):] *Calcite rose de Tantara (Katanga)*. *Natuurwetenschappelijk Tijdschrift, Antwerpen*, [1926], vol. 7 [for 1925], pp. 100–102.

Rose-coloured calcite associated with plancheite and diopside from Tantara was described by A. Schoep [Abstr., vol. 1, p. 416]. A deeper coloured specimen (violet-rose, very nearly the same as that of sphaerocobaltite) from the same locality, associated with quartz and heterogenite, has a pale-rose streak, strong pleochroism (ω pale-rose, ϵ dark-rose), cleavage-angle $75^{\circ}52'$, D 2.72, and gave on analysis: CaO 53.40, CoO 1.96, Fe_2O_3 0.49, insol. 0.07, CO_2 44.07 = 99.99. This contains more cobalt than the 'cobaltocalcite' of F. Millosevich (1910) from Elba; and, as the characters (refractive indices, &c.) are the same as those of calcite, a special name is not needed. L. J. S.

BUTTGEBACH (H.). *Études des sables concentrés de rivières*. Ann. Soc. Géol. Belgique, 1923, vol. 46, Bull. pp. B 213–B 228.
 — *Minéraux du Tanganyika-Moero (Congo Belge)*. Ibid., Bull. pp. B 229–B 234, 7 figs.

A scheme is outlined for the examination of concentrates from river sands. The second paper describes garnets, chrysoberyl, corundum, tourmaline, zircon, andalusite, monazite, spinel, topaz, and tantalite (one crystal of the skogbölite habit) isolated from the sands of the Lukulu and Luizi rivers in Tanganyika province. L. J. S.

BUTTGEBACH (H.). *Cristaux de calcite de Bioul*. Ann. Soc. Géol. Belgique, 1923, vol. 46, Bull. pp. B 170–B 172, 2 figs.
 — *Calcite et barytine de Bioul (Belgique)*. Ibid., 1925, vol. 48, Bull. pp. B 63–B 68, 5 figs.

Calcite crystals from crevices in black limestone are described and five types distinguished. One shows a parallel growth of crystals of two habits, and another is twinned on e (01 $\bar{1}$ 2). New forms are $e^{\frac{3}{2}}$ (0.10.1 $\bar{0}$.11), d^{10} (10.1.1 $\bar{1}$.9), $\odot_1$ (3.10.1 $\bar{3}$.1). Small crystals of baryte are found on the calcite. L. J. S.

GAUBERT (R. [i. e. Paul]). *Sur l'identité de la limonite fibreuse avec la goëthite*. Compt. Rend. Acad. Sci. Paris, 1925, vol. 181, pp. 869-872.

The variations in the optical characters of goethite with change in temperature [Abstr., vol. 1, p. 342] are readily shown by the change in polarization tints between crossed nicols, and this affords a method of readily detecting fine fibres of the mineral. Fibrous limonite from several localities was examined on the heating stage of a microscope and so found to contain goethite. As shown by the action of acids, percentage of contained water, dehydration curves, and staining with aniline, these fibrous limonites also contain admixed impurities; they contain more water than goethite ($\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$) and less than limonite ($2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$).
L. J. S.

CHERMETTE (A.). *Sur la présence de la fluorine dans le filon de barytine de Saint-Clément-sous-Valsonne (Rhône)*. Bull. Soc. Franç. Min., 1924, vol. 47, pp. 57-58.

Small modified cubes of fluorite, usually yellow in colour, are found either on the iron-stained quartz of geodes or in the baryte veins.

E. D. M.

BARTHOUX (J.). *Sur le péridot de l'Ile Jersey*. Bull. Soc. Franç. Min., 1924, vol. 47, pp. 45-46.

Small olivine crystals partly altered to antigorite and derived from a minette consist of the forms *b s a e k h d* [Dana's letters], and are usually tabular parallel to *b*.

E. D. M.

KÔZU (Shukusuké) & MASUDA (Mineichi). *Studies of the thermal changes and dehydration phenomena of some hydrous minerals*. Sci. Rep. Tôhoku Univ. Ser. III (Min. Geol.), 1926, vol. 3, pp. 33-68, 28 figs.

KÔZU (Shukusuké), YAGI (Tsugio), & JIZAIMURA (Shin-jyû-rô). *The dehydration phenomena of apophyllite from Mazé, Japan*. Ibid., pp. 69-76, 3 figs.

Thermal and dehydration curves are given for heulandite, kaolin, china-clay, apophyllite, diaspore, talc, alunite, gypsum, muscovite, and sericite. Loss of weight was determined after heating at various temperatures, and also on a thermo-balance during the heating. With heulandite and apophyllite the breaks in the curve seem to correspond

with a definite number of molecules of water. The changes in refractive indices of kaolin heated at various temperatures are recorded.

L. J. S.

KÔZU (Shukusuké) & MASUDA (Minéichi). *The influence of temperature on the path-difference and on the schillerization in soda-orthoclase and moonstone.* Sci. Rep. Tôhoku Univ. Ser. III (Min. Geol.). 1926, vol. 3, pp. 1-9, 3 pls., 3 text-figs.

Plates (100), (010), (001) of soda-orthoclase $\text{Or}_{44.9}\text{Ab}_{54.5}\text{An}_{1.6}$ from Fredriksvårn, Norway [Abstr., vol. 2, p. 403] were heated at various temperatures up to 1150°C ., and changes in the birefringence are tabulated and plotted. The thermal expansion $\Delta(001)$ was also measured; and Laue photographs were taken after heating the material at various temperatures. The schiller and the double Laue spots persist up to 1150°C . On the different curves breaks are shown at 500° , 700° , and 900°C ., and it is concluded that the internal structure of the soda-orthoclase is the same as that of moonstone [Abstr., vol. 1, p. 314; vol. 3, p. 148].

L. J. S.

SATÔ (Denzô). *Brief notes on fergusonite and allanite from Iyo, Shikoku.* Journ. Fac. Sci. Univ. Tokyo, Sect. II, 1925, vol. 1, pp. 49-52, 1 pl.

Fergusonite as acute pyramids 2-5 cm. long occurs in pegmatite at Hakata-mura, prov. Iyo, Japan. Forms *zscg* [Dana]; cleavage *c* prominent, *s* imperfect. Sp. gr. 5.30; analysis by K. Kimura gave: $(\text{Nb}, \text{Ta})_2\text{O}_5$ 44.97, TiO_2 1.15, SiO_2 0.79, SnO_2 0.35, UO_2 3.18, Y_2O_3 &c. 40.39, Nd_2O_3 &c. 0.89, Al_2O_3 1.35, Fe_2O_3 0.66, MgO 0.58, CaO 1.40, CO_2 0.35, H_2O 3.92 = 99.98. Allanite is found in this pegmatite as large irregular masses and as flat tabular crystals up to 17 cm. long. Forms *acirlsmn* [Dana]; twins on (100) are common. Sp. gr. 3.824; analysis by Y. Minami gave: SiO_2 30.51, TiO_2 0.49, ThO_2 1.84, SnO_2 0.66, Al_2O_3 15.09, Fe_2O_3 3.60, Y_2O_3 &c. 3.02, La_2O_3 &c. 11.53, Ce_2O_3 8.52, FeO 11.47, MnO 2.72, MgO 0.12, CaO 8.70, Na_2O 0.06, K_2O 0.06, CO_2 0.33, H_2O 2.05 = 100.77.

L. J. S.

TSUDA (Hideo). *The principal refractive indices of topaz from Suisawa, prov. Ise.* Japanese Journ. Geol. Geogr., [1926], vol. 4 (for 1925), Abstracts p. (1) [from Journ. Geol. Soc. Tokyo, 1926, vol. 33, pp. 67-71. Japanese].

Determinations in sodium-light on the refractometer gave α 1.6132, β 1.6160, γ 1.6229 ($\gamma - \alpha$ 0.0097, $2V$ $64^{\circ}48'$) and by Tsuboi's dispersion method α 1.614, β 1.616, γ 1.625.

L. J. S.